

# Health Impact Assessment of the proposed Mo'omomi Community-Based Subsistence Fishing Area

*Island of Moloka'i, Hawai'i*

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# Health Impact Assessment (HIA) of the Proposed Mo‘omomi Community-Based Subsistence Fishing Area (CBSFA)

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## Project Partners

**The Health Impact Project** — [pewtrusts.org/en/projects/health-impact-project](http://pewtrusts.org/en/projects/health-impact-project)

The Health Impact Project, a collaboration of the Robert Wood Johnson Foundation and The Pew Charitable Trusts, is a national initiative designed to promote the use of health impact assessments (HIAs) as a decision-making tool for policymakers.

**The Kohala Center** — [kohalacenter.org](http://kohalacenter.org)

The Kohala Center is an independent, community-based center for research, conservation, and education, turning research and ancestral knowledge into action, so that communities in Hawai‘i and around the world can thrive—ecologically, economically, culturally, and socially.

**Sust‘āinable Molokai** — [sustainablemolokai.org](http://sustainablemolokai.org)

Sust‘āinable Molokai is a local, grassroots group formed to inspire youth and all Moloka‘i residents to work toward a more sustainable future for the island, and conduct education and advocacy work that honors traditional and cultural pathways alongside modern strategies for sustainability. Sust‘āinable Molokai builds partnerships and calls upon community networks to restore ‘āina momona (abundance) to the land and people.

# EXECUTIVE SUMMARY

## Introduction

Hawai'i State law provides pathways for island communities to apply for the designation of Community-Based Subsistence Fishing Areas (CBSFAs), allowing for co-management of culturally significant and/or ecologically vulnerable nearshore fisheries by the state and local communities. In the early 1990s residents of the Island of Moloka'i expressed concern about Native Hawaiians' rights to exercise traditional cultural fishing practices in nearshore environments. A task force report, commissioned in 1994 by then-Governor John Waihe'e, recommended that the Mo'omomi fishery area along the northwest coast of Moloka'i serve as a demonstration area, in which fishing activities would be managed by the Ho'olehua Homestead community primarily for subsistence rather than commercial use. The Hawai'i State Legislature passed Hawai'i Revised Statute §188-22.6 that same year, authorizing the Department of Land and Natural Resources (DLNR) to designate CBSFAs and implement management strategies "for the purpose of reaffirming and protecting fishing practices customarily and traditionally exercised for the purposes of [N]ative Hawaiian subsistence, culture, and religion."

Fish and other marine life are prominent staples of traditional Hawaiian diets, and overfishing, commercial harvesting methods, and a gradual movement away from the Hawaiian mahele system of sharing and other ancestral practices were identified as threats to community and cultural food security. Despite the passage of legislation more than 20 years ago, the proposed Mo'omomi CBSFA remained a pilot project. Currently Hui Mālama O Mo'omomi, a community organization based on Moloka'i, is in the process of advancing a formal proposal to make traditional subsistence harvesting practices legally enforceable in the designated area of Moloka'i's north shore.

This Health Impact Assessment seeks to provide information that will help evaluate the CBSFA proposal by taking into consideration potential effects of CBSFA status on community well-being. The authors also hope that the findings and recommendations of an HIA particular to the Mo'omomi area may also prove relevant to CBSFA proposals from other regions of the state where such co-management strategies are being considered.

## About This Study

Health Impact Assessment (HIA) is a recognized and structured method bringing together scientific data, subject matter expertise, and community input to identify the potential health effects of proposed new laws, regulations, projects, and programs to offer practical recommendations to minimize risks and capitalize on opportunities to improve



community well-being. For the purposes of this HIA we use the World Health Organization's definition of health as a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity. Because this assessment was conducted in and about a largely native Hawaiian community, traditional Hawaiian concepts of health were taken into careful consideration.

The HIA project staff interviewed health and DLNR representatives, Native Hawaiian scholars, and organizational leaders, and held a community meeting to determine the key issues to examine with regard to the potential health effects of this particular CBSFA policy and rule-making process. Four major underlying determinants of health emerged from these consultations and are examined in the study:

- Self-determination and control of resources
- Traditional marine resource management and transmission of ancestral knowledge
- Access to marine resources for family and community subsistence
- Commercial fish sales and commercial fisher income

## **Key Findings**

The assessment process combined data gathered from existing research and community surveys and reports, as well as from transcripts of two community meetings and 18 structured interviews of Moloka'i residents, Ho'olehua Homesteaders, public health officials, landowners, commercial and subsistence fishers, and community organizers on Moloka'i, in addition to commercial fishing representatives on O'ahu. Key findings included the following:

### **1. Self determination and control over resources**

In traditional Hawaiian conceptions of health, personal harmony and well-being are deemed to stem from one's relationship with the land, sea, and spiritual world. Detachment from the natural world imposed by historical events and contemporary state and federal laws can create a sense of marginality, helplessness, and alienation, with negative effects on physical and mental health. Both research findings and community interviews confirmed that the ability of community members to co-manage fisheries and take responsibility for local marine resources would contribute to their health and well-being by restoring a sense of autonomy and balanced connection to the natural world.

### **2. Traditional marine resource management and transmission of ancestral knowledge**

Proponents of CBSFA designation emphasize that cultural food security—obtaining food that both satisfies nutritional needs and maintains connection with cultural and social practices and traditions—is critical not only for the physical health of Native Hawaiians but also for their overall well-being. Community members consulted

during the study expressed concern that near-shore fisheries were being depleted, with a consequent threat to cultural food security. In addition, isolation from aspects of one's cultural practices is understood to have a negative effect on indigenous health, contributing to stress, trauma, and mental and physical health disparities when compared to other ethnic groups.

The proposed Mo'omomi CBSFA would enable Moloka'i's Native Hawaiian communities to engage in and carry forward traditional fishery management practices to assure the availability of marine resources over time; strengthen connections to place, cultural identity and values; and to share abundance with *'ohana* and *kūpuna*, thereby creating and sustaining community resilience. The transmission of ancestral knowledge of fishing and fishery management has also been identified as a way to affirm the value and maintain the vitality of older community members while providing an *'āina*-based, culturally competent learning environment that improves the sense of well-being and academic achievement of Native Hawaiian children and youth.

### **3. Access to marine resources for family and community subsistence**

Given the relative abundance of marine life in the Mo'omomi area at this time, a subsistence-focused management strategy would likely stabilize or increase the area's marine resources, providing on-going availability and access to high-quality nutrition in the neighboring communities and contributing to family and island food security. An educational program coupled with the CBSFA designation could encourage a return to a more traditional Pacific Island diet in place of processed and less nutritionally rich foods that currently contribute to chronic disease among Native Hawaiians.

### **4. Commercial fish sales and fishers' income**

Community consultations indicate that the people of Moloka'i generally don't fish at Mo'omomi in order to sell their catch. Division of Aquatic Resources data indicate that relatively few fishers report commercial catch from Mo'omomi, commercial and near-shore subsistence fishers in large part target different species, and commercial fishers focus on the deeper sea areas beyond the nearshore CBSFA proposed boundary. Thus research concludes that CBSFA policy and rules for Mo'omomi would not significantly impact commercial fishing income at this time.

## Recommendations

The assessment findings detailed above suggest the following recommendations:

- 1. Support BLNR approval of CBSFA rules for Mo‘omomi, with a clear co-management strategy and resources for its implementation.**

Involvement in the development and implementation of CBSFA rules is likely to increase a sense of control, connection, and sovereignty over local resources that could have a positive effect on Native Hawaiian well-being for the population that accesses the Mo‘omomi fishery. Community consultations regarding Mo‘omomi indicate that the majority of people interviewed believe that allowing communities to devise management regulations would be good for the protection of marine resources and the perpetuation of a subsistence choice independent of global economic forces. Some community members opposed or were skeptical of the proposed Mo‘omomi rule-making process, for reasons which included:

- Personal conflicts among community members who had different opinions as to how the rules should be formulated;
- Potential misunderstanding of CBSFA intent with the belief that rules will eliminate fishing altogether and prevent people from feeding their families.

Because the DLNR CBSFA process requires community outreach and at least one required public hearing, a corollary recommendation of this report is to continue community dialogue between the leaders and members of Hui Mālama O Mo‘omomi, the DAR administration, and other residents of Moloka‘i to promote maximum understanding of and support for proposed regulations.

This consensus-seeking process is time-consuming and is not necessarily a traditional Hawaiian method of rulemaking. It could be argued that not giving credence to the authority of a to make and enforce resource management regulations is a violation of Native Hawaiian legal rights (for a legal background, see Appendix B at [koha.la/moomomi-legal](http://koha.la/moomomi-legal)). Given HIA findings about the positive value of preserving and transmitting ancestral knowledge, time is of the essence for CBSFA approval, so that community elders have the opportunity to implement traditional management strategies and train others to carry this knowledge into the future.

Delaying the CBSFA approval process is not recommended; however, the interviews conducted for this assessment suggest that the most positive outcome for community cohesion, and by implication community well-being, will be reached through on-going education about the potential benefits and the regulatory details of the CBSFA.



**2. Continue and support the Mo‘omomi CBSFA as a place for the study and teaching of traditional Native Hawaiian fishery management practices.**

CBSFA designation and management has the ability to further engage Ho‘olehua and Moloka‘i residents in traditional Native Hawaiian cultural practices and to provide a focal point for the intergenerational transmission of ancestral cultural knowledge, thereby supporting Native Hawaiian well-being through strengthened connections to cultural identity, place, and community. A recommendation that stems from HIA project interviews and educational research literature is to continue Hui Mālama O Mo‘omomi’s efforts to maintain the Mo‘omomi CBSFA as a place for the study and teaching of traditional Native Hawaiian fishery management practices, with recognition and assistance from Hawai‘i’s educational institutions and with the human and financial resources to encourage the perpetuation of cultural knowledge and traditional practices, along with the teaching and use of contemporary scientific methods that can assist in documenting the long-term results of those practices.

**3. Emphasize the value of traditional Hawaiian foods in a subsistence-based diet.**

Dietary research in the Hawaiian community has confirmed that returning to a diet based on fish protein and traditional Polynesian starches such as *kalo* and *‘uala* reduces metabolic disease indicators and likely leads to greater physical health. Those on Moloka‘i who are advocating for a Mo‘omomi CBSFA, along with research in Hā‘ena on the Island of Kaua‘i, suggest that assuring access to the fishery for subsistence purposes will result in the relatively wide distribution of gathered marine resources to local families. Community interviews on Moloka‘i, however, indicate that many people are eating less fish than they did in the past. One of the primary reasons cited is that there are other choices available, considering the abundance of low-cost, high-fat sources of protein in local grocery stores and fast-food establishments. Given the stated pride that Moloka‘i residents have in the extent of their subsistence economy and their desire to be more food self-sufficient, as emphasized in numerous community reports and visioning sessions, there may be an opportunity to use the cultural relationship and control of a resource like Mo‘omomi to publicize and encourage a return to a more traditional Hawaiian diet.

## **Conclusion**

The findings from this Health Impact Assessment support BLNR approval of CBSFA regulations for Mo‘omomi, with a clear co-management strategy and resources for its implementation. Both secondary sources and community interviews suggest that the CBSFA has the potential to enhance individual, family and community well-being by (1) supporting self-determination and self-governance of marine resources guided by Native Hawaiian tradition with a history of sustaining the health of those resources; (2) strengthening social connections enabled by traditional subsistence practices and the

transmission of those practices and their associated values to younger generations; and (3) improving community food security and assuring the availability of a high quality source of food over time. Findings also suggest that the CBSFA limitations will not substantially affect income generated from commercial fishing and may have a positive effect on fish stocks in areas outside of the CBSFA.



# Health Impact Assessment (HIA) of the proposed Mo'omomi Community-Based Subsistence Fishing Area (CBSFA)

## INTRODUCTION

In 1994 the Hawai'i State Legislature created a process for designating Community-Based Subsistence Fishing Areas (CBSFA) (Act 271) in response to Moloka'i community members' concerns about overharvesting from off-island commercial fishers and the ability of Native Hawaiians to maintain their traditional subsistence practices and rights in the near-shore marine areas of their island. A 1994 *Governor's Moloka'i Subsistence Task Force Final Report* documented the importance of subsistence practices for Moloka'i families and found that subsistence serves as a vital and sustainable sector of Moloka'i's economy. Through extensive community surveys and focus groups, the task force identified problems that were making it harder for the community to engage in subsistence fishing, hunting, and gathering practices. Overharvesting, the use of improper harvesting methods, and the decline of subsistence values, customs, methods, and practices were found to be the critical threats to subsistence fishing practices.<sup>1</sup> The fishery along the northwestern coast of Moloka'i, from Nihoa flats to 'Īlio Point, experienced a rapid decline and near collapse of its *kumu* (white saddle goatfish, *Parupeneus porphyreus*) and *ula* (spiny lobster, *Panulirus marginatus*) populations, prompting an immediate need for change in the way the fishery was managed and fished.

As a part of its policy recommendations, the task force proposed that the northwest Moloka'i coastline serve as a demonstration area where fishing activities would be self-regulated by the Ho'olehua Homestead community, and commercial take and sale of resources would ideally be prohibited. The community took this recommendation and advocated for the adoption of the CBSFA legislation in 1994 by the Hawai'i State Legislature.<sup>2</sup> This legislation, codified as Hawai'i Revised Statute (H.R.S.) §188-22.6, provides direction for the Department of Land and Natural Resources (DLNR) to administratively designate CBSFAs and implement management strategies "for the purpose of reaffirming and protecting fishing practices customarily and traditionally exercised for the purposes of [N]ative Hawaiian subsistence, culture, and religion."<sup>3</sup>

The pilot project was initially planned for the entire five-mile stretch of Moloka'i's northwest coastline and up to two miles offshore, the total area considered important for traditional subsistence and the most overfished.<sup>4</sup> DLNR narrowed the project to a one-mile length along Mo'omomi and Kawa'aloa Bays and up to a half-mile out from shore.<sup>5</sup> The pilot project lasted for two years, from July 1, 1995 to June 30, 1997, with the expectation that administrative rules customized to the area and reflecting Hawaiian traditional knowledge of fishery resources would be developed and approved within this two-year time window.<sup>6</sup> Hui Mālama O Mo'omomi, an organization that has been

leading the effort to permanently establish the CBSFA, utilized a Hawaiian, indigenous methodology to study and monitor resources. These methods and their successes in restoring fishery health are well documented in several scientific studies that acknowledge traditional ecological knowledge. However, the State accepted only data acquired through conventional Western scientific methods and determined the results to be inconclusive due to a failure on its part to conduct an adequate amount of surveys for baseline data collection and monitoring.<sup>7</sup> Ultimately, DLNR allowed the project to sunset and rejected Hui Mālama O Mo‘omomi’s CBSFA management plan, determining that the proposed five-mile management area was too broad and because of reluctance on the part of the DLNR at that time to share management responsibilities.<sup>1</sup>

Despite these obstacles, Hui Mālama O Mo‘omomi has adhered to *konohiki* [traditional Hawaiian natural resource manager]-based conservation strategies that are modeled on ancient approaches to resource management (e.g., using the traditional Hawaiian moon calendar to monitor fish spawning cycles, feeding habits, and aggregation), and encouraged alternating harvest sites to allow for replenishment and exercising self-restraint in harvesting specific species during their critical reproduction phases. Hui Mālama O Mo‘omomi is currently advancing a renewed proposal that would specifically protect traditional practices oriented towards subsistence harvesting in the designated area of Moloka‘i’s north shore from Pelekunu to ‘Īlio Point.

Over the past 20 years of informal community-based management at Mo‘omomi, only one CBSFA has been established in Hawai‘i: the community of Hā‘ena on the island of Kaua‘i has received successful CBSFA designation with customized rules in place for its traditional fishery, achieved after more than seven years of negotiations among various

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<sup>1</sup> Higuchi (2008), at 8, n. 177 (citing Mar. 5, 2008 phone interview with Francis Oishi, Program Manager, State of Haw. Dep’t of Land & Natural Res., Div. of Aquatic Res.); See A. Friedlander, K. Poepoe, K. Helm, P. Bartram, J. Margos and I. Abbott, Application of Hawaiian traditions to community-based fishery management, in Proceedings 9th Int’l Reef Symp., Bali, Indonesia, 328, 337 (2000) (describing the community’s involvement in renewing cultural protocols and traditional, communal codes of conduct to conserve and respect the resources; teaching youth Hawaiian traditional practices in marine conservation; the use of the traditional Hawaiian moon calendar in observing marine biological and ecological cycles that include monitoring fish spawning, aggregation, and feeding behavior. Observing that “[c]ommunity-based management is thought to be useful in overcoming what is seen as the distant, impersonal, insensitive and bureaucratic approach now characterizing the role of government in fisheries management.”); See Kelson K. Poepoe, Paul K. Bartram, and Alan M. Friedlander, The Use of Traditional Hawaiian Knowledge in the Contemporary Management of Marine Resources, in FISHERS’ KNOWLEDGE IN FISHERIES SCIENCE AND MANAGEMENT 119, 140 (Nigel Haggan, Barbara Neis and Ian G. Baird, eds. 2007) (explaining that the synergistic integration of Hawaiian traditional knowledge with contemporary fishery management would be ideal, however, there are political implications because this kind of integration “threatens to change power relations between indigenous groups and the dominant society.”).

stakeholders through the course of over 70 meetings. Today, there is interest in establishing CBSFAs from Native Hawaiian communities on five islands.

The following Health Impact Assessment seeks to inform Hawai‘i’s decision-makers as they review and evaluate the current community-based subsistence fishing area (CBSFA) proposal for the Mo‘omomi fishery on the north shore of Moloka‘i, taking into consideration the effects of the proposed CBSFA regulations on community well-being. The findings and recommendations of an HIA particular to the Mo‘omomi site may also provide relevant information to CBSFA proposals from other regions of the State where such proposals are being considered.

While this assessment process does not directly address the legal or environmental issues involved in fishery management decisions, it does focus on health and health impacts in a way that is informed by a Native Hawaiian perspective in which biophysical, mental, cultural, and environmental health are deeply intertwined.

### **What Is a Health Impact Assessment (HIA)?**

From <http://www.pewtrusts.org/en/projects/health-impact-project/health-impact-assessment><sup>8</sup>

Every day, policymakers in many sectors have opportunities to make choices that—if they took health into account—could help stem the growth of pressing health problems like obesity, injury, asthma, and diabetes that have a huge impact on our nation’s healthcare costs and on people’s quality of life. A Health Impact Assessment (HIA) helps policymakers take advantage of these opportunities by bringing together scientific data, health expertise, and public input to identify the potential—and often overlooked—health effects of proposed new laws, regulations, projects, and programs. It offers practical recommendations for ways to minimize risks and capitalize on opportunities to improve health. An HIA

- looks at health from a broad perspective that considers social, economic, and environmental influences;
- brings community members, business interests, and other stakeholders together, which can help build consensus;
- acknowledges the trade-offs of choices under consideration and offers decision makers information and practical recommendations to maximize health gains and minimize adverse effects;
- puts health concerns in the context of other important factors when making a decision; and

- considers whether certain impacts may affect vulnerable groups of people in different ways.

Note that “health” in this context generally implies a definition similar to that of the World Health Organization, in which health is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity.

An HIA is a structured, but flexible, process that generally includes the following steps:

- **Screening** determines whether or not an HIA is warranted and would be useful in the decision-making process.
- **Scoping** collaboratively determines which health impacts to evaluate and how to evaluate them.
- **Assessment** includes gathering existing conditions and predicting future health impacts using data, expertise, and experience, as well as qualitative and quantitative research methods.
- **Recommendation** engages partners in prioritizing evidence-based proposals to mitigate or elevate positive health outcomes.
- **Reporting** communicates findings.
- **Monitoring** tracks the effects of an HIA on decision-making and its implementation, as well as on health determinants and health status.

### **Community-Based Subsistence Fishery Area (CBSFA)**

The DLNR Division of Aquatic Resources (DAR) has legal responsibility for promulgating administrative regulations for managing nearshore marine areas throughout Hawai‘i. However, the DLNR Division of Conservation and Resource Enforcement (DOCARE) has limited ability to enforce state regulation due to its small cadre of enforcement officers charged with monitoring all land and ocean resources on every island. As noted in the Introduction, there is legislation that enables communities in Hawai‘i to apply for a Community-Based Subsistence Fishing Area designation that paves the way for State-community nearshore fishery co-management, anticipating that local involvement will lead to more sustained and effective protection of marine resources. H.R.S. §188-22.6 sets out the process and requirements for obtaining an official CBSFA designation that includes the name of the applicant organization, a description of the proposed fishery location, impact on public uses, a management plan with specific area rules, monitoring and evaluation processes, funding and enforcement methods. The Hawai‘i Board of Land and Natural Resources (BLNR) is the decision-making body that grants CBSFA status and customized regulations for the CBSFA. Once established, DLNR co-manages the CBSFA with community members.



There are multiple steps to obtaining CBSFA status. The process includes completing a management proposal; multiple stakeholder meetings; drafting administrative rules through DAR; rules review by the Attorney General's office and the Small Business Regulatory Review Board; approval by the Governor to allow for a public hearing; the holding of a public hearing in the affected community; another hearing before BLNR for official approval of the administrative rules; and the Governor's signature to allow the administrative rules to take effect. Over the years, Hui Mālama O Mo'omomi has undertaken several steps in this process and has submitted a number of management proposals, held several community meetings for feedback, worked with DAR to develop proposed administrative rules, and gone back to the community for feedback. With the recent hire by DAR of a CBSFA Planner, there is now a standardized procedures guide for CBSFA designation. Hui Mālama is now starting the process over by revising its management proposal according to the requirements covered in the new CBSFA guide. The following is a diagram taken from the CBSFA procedures guide outlining the process each community must undertake for designation and approved rules.<sup>9</sup>

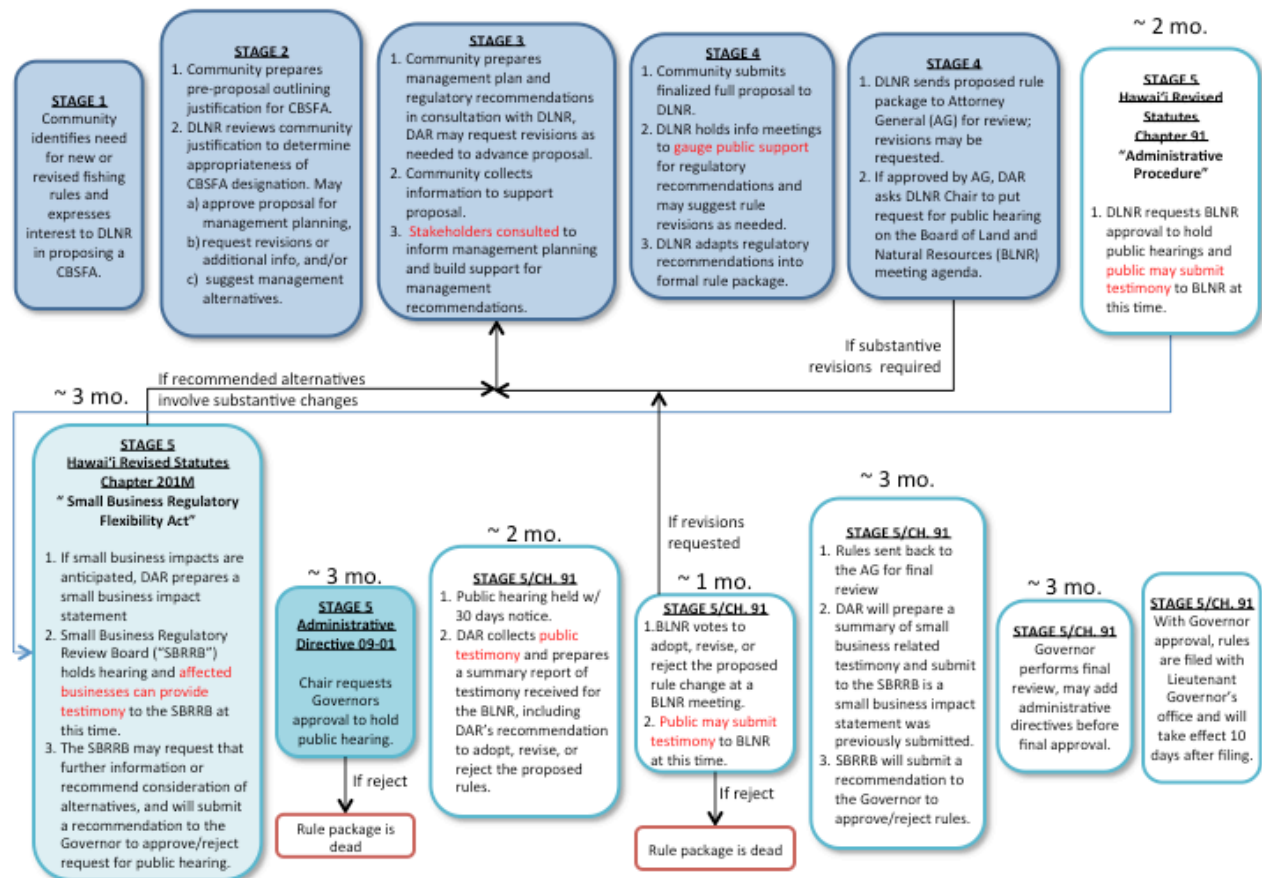


Figure 1. Adapted from Kittinger, J. N., A. L. Ayers, and E. E. Prahler. 2012.<sup>10</sup>

Project partners Shaelene Kamaka‘ala and Malia Akutagawa, from Hui ‘Āina Momona at the University of Hawai‘i at Mānoa’s William S. Richardson School of Law and Hawai‘inuiākea School of Hawaiian Knowledge, have prepared a thorough discussion of the legal underpinnings of the CBSFA legislation, with important historical context for the origin and sources of Native Hawaiian Rights and the statutory mandates of the State to protect all customary and traditional rights of *ahupua‘a* tenants exercised for subsistence, cultural, and religious purposes.

For the purposes of this HIA, we will use a working definition of *ahupua‘a* as a “culturally appropriate, ecologically aligned, and place-specific unit(s) [of land] with access to diverse resources.”<sup>11</sup> Most important in the discussion of legal issues is the point that reinstituting traditional subsistence fishing practices, including a *konohiki* system of resource management, is consistent with and supported by State constitutional and statutory mandates. The full legal discussion can be found in Appendix B.

## SCREENING AND SCOPING

One of the reasons for undertaking this HIA for the proposed Mo‘omomi<sup>2</sup> CBSFA was that proponents of CBSFA designation, on Moloka‘i and other Hawaiian Islands, have emphasized that cultural food security is critical for the physical and spiritual health of Native Hawaiians. Cultural food security means that residents have ways of obtaining food that satisfy their family’s nutritional needs and maintain cultural and social ties. Community members who were initially contacted by project staff expressed concern that nearshore fisheries were being depleted, with a consequent threat to cultural food security.

In considering whether to examine potential impacts of CBSFA management policy on Native Hawaiian well-being in the Mo‘omomi area, project staff members consulted representatives from Hui Mālama o Mo‘omomi, DLNR, Department of Hawaiian Home Lands (DHHL), Hawai‘i Department of Health (HDOH), Kua‘āina Ulu ‘Auamo (KUA), Moloka‘i Land Trust, The Nature Conservancy (TNC), and Moloka‘i Ranch, along with Native Hawaiian scholars at the University of Hawai‘i, to determine whether these organizations would find a Health Impact Assessment useful in the CBSFA rule-making and final decision-making process and whether they would participate in the data collection phase of the HIA. These stakeholders expressed interest and willingness to be

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<sup>2</sup> Note: all further references to the terms “Mo‘omomi” or “Mo‘omomi CBSFA” are to be understood as including not just the geographic location of Mo‘omomi Bay in Northwest Moloka‘i, but the entire proposed region for CBSFA designation that covers the expanse of several *ahupua‘a* and place names from ‘Īlio Point to Pelekunu on the island’s north shore.

called upon to provide information and expertise in the HIA process, as well as confirmed their beliefs that findings could be useful in mediating among various stakeholders and potentially competing interests.

The HIA scoping phase requires feedback and participation from community members and organizational stakeholders to ensure the analysis reflects the diverse interests and concerns of those affected by the policy being examined. The HIA project staff used the following methods to solicit input and determine the most important and feasible health aspects to examine during the assessment process:

1. HIA team members conducted preliminary interviews in November 2014 with key informants to solicit feedback on the utility of the HIA and to identify relevant stakeholders and general health areas affected by the CBSFA policy.
2. HIA team members hosted a community meeting on Moloka'i in January 2015. Relevant stakeholders—particularly users of the Mo'omomi shoreline and fishery—were invited to the meeting, which was open to the public. Led by HIA team members and a community leader, the assembled group was introduced to the HIA process and their feedback was solicited on the following questions:
  - What is health to you?
  - What is the value of Mo'omomi to your life and well-being?
  - What would be the benefits and/or drawbacks of implementing community-managed fishery rules?
  - What are the negative impacts of waiting for the fisheries rules to be approved?
3. Follow-up individual interviews were conducted with additional informants on Moloka'i to better understand and contextualize the comments provided at the community meeting.

The project staff selected the following issues for study based on the input received from community residents, organizational leaders, and agency stakeholders:

- Self-determination and ability to control resources.
- Ability to practice traditional marine activities and transmit traditional practices to subsequent generations.
- Ability to access fish/marine resources for family and community consumption.
- Effects on marine resource sales and fishing incomes.

These health determinants are linked to downstream impacts on community well-being, including chronic disease and mental health outcomes. A more complete description of each of these determinants, and the justification for their inclusion, can be found in the corresponding assessment sections below.

The potential impact of the CBSFA policy on human health was assessed in terms of its effect on physical health, mental health, spiritual health, and cultural health; however, this relationship is mediated by the direct effect of the CBSFA policy on the health of the marine ecosystem. It is important to note that we did not directly assess how community management could impact marine ecosystem health; instead, we relied on secondary literature that establishes the link between community-based and adaptive resource management and positive outcomes for marine conservation. An assumption of the link between the enactment of the CBSFA policy and improved marine health forms the basis for analysis of how a sustainably managed marine ecosystem will likely impact various components of human health.

## **COMMUNITY BACKGROUND**

### **The Island of Molokaʻi<sup>12</sup>**

Molokaʻi, situated squarely in the middle of the chain of Hawaiian Islands, was historically known as the land of “fat fish and kukui nut relish,” and produced enough surplus food to feed the neighboring isles. In recent decades, this island has been nicknamed the “Last Hawaiian Island” because of its 72 percent Native Hawaiian population, lack of urban development, and its residents’ continued subsistence practices.<sup>13</sup> While the community is certainly not homogenous on Molokaʻi, many residents take pride in their ability to provide food for themselves, sustain their families, and share with neighbors.

Historically, the pace of cultural change on Molokaʻi was slower than on the other major Hawaiian Islands, largely because Western trading vessels and whaling ships bypassed it. Westerners considered Molokaʻi a barren land with a sparse population, limited freshwater resources, and lacking in adequate protected harbors. As a result, Hawaiians on Molokaʻi continued traditional farming and fishing subsistence activities throughout the nineteenth century and well into the twentieth. The Hawaiian Homestead program established under federal law facilitated a process for rehabilitating dislocated Native Hawaiians through farming and home ownership;<sup>14</sup> this program was first piloted on Molokaʻi. The early success of these Native Hawaiian families opened the door for homesteading on all the other islands. However, shifting priorities to corporate monocrop agriculture with the growth of the pineapple industry on Homestead land

starting in the 1920's undercut Native homesteaders' small agricultural enterprises, integrating them into and making them dependent upon a cash economy based on wage earning and marketing of cash crops.<sup>15</sup>

Today, Hawaiian Homesteaders and the broader Moloka'i population still rely heavily on Moloka'i's reefs, streams, and forests to survive. When the pineapple agribusiness closed on Moloka'i in the mid 1970's, subsistence became a more vital aspect of the economy.<sup>16</sup> According to a 1993 random sampling of Moloka'i families, subsistence foods accounted for an average 28 percent of their 'ohana diet; 51 percent of the respondents considered subsistence to be very important to them.<sup>17</sup> Subsistence living on Moloka'i is not merely utilitarian: indigenous livelihoods are considered a tradition that creates a strong sense of a unified community and binds the social elements necessary for cultural perpetuation together.<sup>18</sup> A vision statement designed by a broad cross-section of the island's population describes Moloka'i as a community that "takes pride in its resourcefulness, self-sufficiency and resiliency." It states that "the values of *aloha 'āina* [love of the land] and *mālama 'āina* [care for the land] guide our stewardship of Moloka'i's natural resources, which nourish our families both physically and spiritually."<sup>19</sup> Moloka'i residents reaffirmed these values in 2008 when the community drafted "Moloka'i: Future of a Hawaiian Island" and made clear their intent to leave a visible legacy for their children: "an island *momona* [abundant] with natural and cultural resources, people who *kōkua* [help] and look after one another."<sup>20</sup>

Moloka'i residents' sense of aloha 'āina, articulated in numerous community documents, has been displayed visibly through a long history of island-based activism against commercial development. Residents have organized on numerous occasions to stave off tourism development that they believe would threaten the natural resource base.<sup>21</sup> Community activism halted plans by the Moloka'i Ranch, a private landowner, to develop 200 luxury lots on the southwest corner of Moloka'i, a fragile ecosystem known as Lā'au Point. In 2008 the Ranch closed its facilities, golf course, movie theater, restaurants, tentaltows, and lodge. Residents say that reliance on subsistence practices has increased since the closure of the hotel (Moloka'i's largest employer at that time), which raised an already high rate of unemployment on the island to 17.5% as of 2012.<sup>22</sup> A recent study in 2012 found that 40 percent of Moloka'i families' food came from subsistence activities and that 72 percent felt subsistence was very important to them.<sup>23</sup> Most recently, Moloka'i *kūpuna* [elders] and cultural practitioners have begun to revitalize the 'Aha Kiole, the traditional Hawaiian system of natural resource

management, in order to ensure best practices for sustainable management of the natural and cultural resources upon which Molokaʻi livelihoods depend.<sup>3</sup>

### **Hoʻolehua and Hawaiian Homesteading**

The 1920 Hawaiian Homes Commission Act set aside 203,500 acres on five islands as Native Hawaiian homestead for people who were at least 50 percent blood quantum of those descended from the islands' eighteenth-century indigenous inhabitants.<sup>24</sup> The Act, signed by President Woodrow Wilson in 1921, was conceived as a "breath of life for a dying race," a people whose numbers had dwindled to 22,600 from 142,650 in the preceding century. It aimed to give Native Hawaiians a chance to be self-sufficient by returning them to the land that had sustained them for centuries. The first homesteads were awarded on Molokaʻi, an island that is only 10 miles wide and 37 miles long, with 33,700 acres reserved as Hawaiian home lands.

Hoʻolehua is an unincorporated community in Kualapuʻu on Molokaʻi. Opened in 1924, Hoʻolehua was the second homestead site on the island established after the U.S. Congress passed the Hawaiian Homes Commission Act in 1921. The first Hoʻolehua homesteaders were selected for their self-sufficiency;<sup>25</sup> succeeding generations have endured despite the harsh land and ocean environment. Residents of Hoʻolehua, most of whom are Native Hawaiian, rely on the coastal area of Moʻomomi for subsistence as well as the preservation of traditional practices and cultural beliefs. In addition to marine and natural resources, the coastal area of Moʻomomi is rich in artifacts and human burial remains, mostly from prehistoric Hawaiian communities and activities dating back to the eleventh century.<sup>26</sup>

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<sup>3</sup> In 2012, the State Legislature passed Act 288, now codified as H.R.S. §171.4-5 which establishes a Statewide 'Aha Moku Advisory Committee (AMAC) within DLNR for the purpose of advising on issues related to:

- (1) Integrating indigenous resource management practices within western management practices in each moku;
- (2) Identifying a comprehensive set of indigenous practices for natural resource management;
- (3) Fostering the understanding and practical use of native Hawaiian resource knowledge, methodology, and expertise;
- (4) Sustaining the State's marine, land, cultural, agricultural, and natural resources;
- (5) Providing community education and fostering cultural awareness on the benefits of the aha moku system;
- (6) Fostering protection and conservation of the State's natural resources; and,
- (7) Developing an administrative structure that oversees the aha moku system.

Representatives from each island are appointed by the governor. Molokaʻi's 'Aha Kiolo is comprised of a core council with representation from four moku (district/regional) councils (Koʻolau/Manaʻe Moku, Kawela Moku, Palaʻau Moku, and Kaluakoʻi Moku). The 'Aha Kiolo o Molokaʻi facilitates community meetings that deal with the care of the island's natural resources and cultural traditions. Consensus reached at the local-level is communicated to the Statewide AMAC via Molokaʻi's representative leader or poʻo.



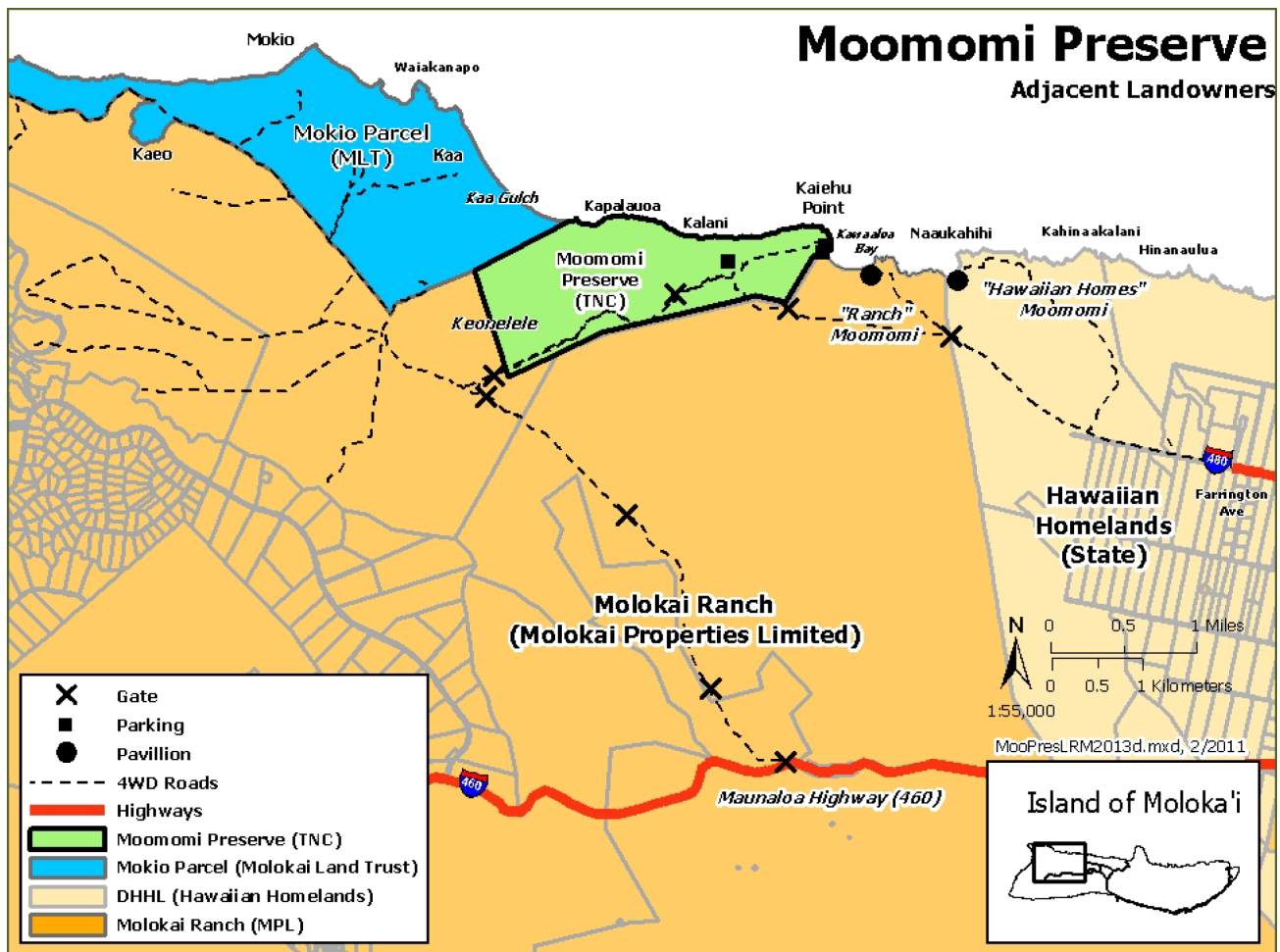


Figure 2. From Mo'omomi Preserve Draft Long Term Management Plan 2013–2018, The Nature Conservancy of Hawai'i, May 2011.<sup>27</sup>

The population of Kualapu'u, where Ho'olehua is located, is 2,027, in comparison to the total population of Moloka'i at 7,345.<sup>28</sup> According to the American Community Survey (ACS) 2009–2013, there are 1,249 people (630 females and 619 males) in Ho'olehua itself. Almost 60 percent of the residents identify as Native Hawaiian. Residents of Ho'olehua have a larger percent of family households, lower family incomes, and lower per-capita income than the rest of Maui County and the state. The mean annual income per capita in Ho'olehua is \$18,805, almost \$12,000 less annually than the average state income per capita of \$29,305.<sup>29</sup> In addition, Native Hawaiian and Pacific Island populations have a disproportionately high rate of chronic disease and the shortest life expectancy of any population in the U.S.<sup>30, 31, 32, 33</sup>

These statistics have resulted in outsiders defining Moloka'i's communities by their "lack of": lack of employment, lack of affordable housing, lack of educational resources, lack of training and skills for the 21st century economy, lack of infrastructure for electricity and water. However, this is not the way most residents feel about their home. They see it as a special place, the last truly Hawaiian Island, an island that has not followed the path to

become a tourist destination like the other Main Hawaiian Islands. Instead, residents have fought to preserve indigenous tradition and culture. While others may see Moloka‘i as anti-development, many see Moloka‘i as pro-lifestyle, seeking to restore abundance through balance and right relationship (*pono*) and through the ancestral meaning and practice of sustainability.<sup>34, 35</sup>

**Health Indicators**

On Moloka‘i, Native Hawaiians make up the largest ethnic group on the island at more than 60 percent.<sup>36</sup> The state of Hawai‘i’s life expectancy—81.3 years—is the longest in the nation, according to the National Center for Health Statistics. At 74.3 years, however, the life expectancy for Native Hawaiians in Hawai‘i is consistently lower than both the state and national average, with significant differences starting in the mid-life age range, despite a steady improvement over the course of fifty years (1950 to 2000).<sup>37, 38</sup>

As noted above, the 231,121 Native Hawaiians residing in Hawai‘i have a disproportionately higher prevalence of many chronic health conditions than any other ethnic group in the state, with death rates 44 percent higher than average for heart disease, 39 percent higher for cancer, 31 percent higher for strokes, and an alarming 196 percent higher for diabetes.<sup>39, 40, 41</sup>

**Socio-Economic Determinants of Health**

Poverty—either alone or in combination with other factors—can contribute to inequitable health outcomes. For example, research suggests that living two times below the federal poverty level imposes a greater societal health burden than either smoking or obesity.<sup>42</sup> That being said, Native Hawaiians in Hawai‘i have the lowest incomes among ethnic groups;<sup>43</sup> poverty indicators for residents of Moloka‘i, who are predominantly Native Hawaiian, are significantly higher than for the state as a whole (Table 1).

	West Moloka‘i	East Moloka‘i	Maui County	Hawai‘i State
Below poverty	21%	21%	11%	11%
Households using SNAP	27%	24%	12%	10%
Unemployed	18%	12%	9%	7%

Table 1. Comparison between Moloka‘i, Maui County, and Hawai‘i State on Poverty Indicators.<sup>44</sup>

Federal poverty threshold designations set by the U.S. Census are not geographically adjusted and do not take into account the higher costs of living in Hawai‘i. Consequently, data from federal calculations may not adequately represent the proportion of Moloka‘i residents who may strain to provide for their families.<sup>45</sup> Many Moloka‘i families supplement their regular household income through subsistence activities, which will be further discussed in the assessment section of this document.

## Historical Perspective on Native Hawaiian Well-Being

The colonization of Native Hawaiian lands and the ensuing dominance of U.S. mainstream culture have affected Native Hawaiians' sense of well-being. Marsella et al. (1995) contend that some contemporary Native Hawaiians suffer from feelings of demoralization, alienation, and marginalization as a result of the destruction to their native identity, way of life, and the loss of the nation.<sup>46</sup> Kaholokula (2007) notes the following about Native Hawaiians and depression:

- Psychological data support the idea that Native Hawaiians may be suffering higher rates of emotional distress compared to other ethnic groups in Hawai'i and the continental U.S.
- Two community-based studies indicate the prevalence of depressive symptoms to be 15 to 20 percent among Native Hawaiians, which is higher than the estimated 10 percent in the general U.S. population.
- According to the Behavioral Risk Factor Surveillance System (2003) data, Native Hawaiians (37.4 percent) are more likely to perceive themselves as having poorer mental health status compared to Caucasians (33 percent), Japanese (26.8 percent), Filipinos (20.2 percent), and other ethnic groups (30.8 percent).<sup>47</sup>

In addition to depression, suicidal ideation is a concern for Native Hawaiian communities. Look et al. (2012) describe how families who are unhappy are more susceptible to diseases, hypertension, and suicidal ideations and attempts.<sup>48</sup> Overall, Native Hawaiians have higher rates of suicide than other ethnic groups and have a higher lifetime prevalence of suicide.<sup>49</sup>

The negative health indicators above could be considered a response to the historical legacy of an indigenous people's encounter with Western colonization and forced transformation to a Western wage-based economy. The first people of Hawai'i learned how to survive on the limited resources of the islands by studying and understanding the processes of nature in the ocean, streams, land, mountains, and cosmos. Practices and knowledge that enabled survival were honed and adapted, growing into time-tested traditions embodied in language, diet, the structure of the social system, and as values that governed the way people maintained relationships and kept order. This is the foundation of Pacific Island identity, one that is rooted in family, genealogy, and place.<sup>50</sup>

Historical events worked to disrupt these fundamental relationships to people and to land, which in turn eroded spiritual and mental well-being. Following contact with European explorers, traders, missionaries, plantation farmers, and immigrants who settled in the islands, the indigenous culture of Hawai'i experienced and continues to face numerous cultural transformations. Significant changes to land-based traditional lifeways

occurred during the Post-Contact Era, which was characterized by an influx of new people, ideas, and technologies.<sup>51</sup> Major events included a near extinction of the Native Hawaiian population from introduced infectious diseases, abolishment of the *kapu* system [traditional Hawaiian religious and social system], mass conversion to Christianity, privatization of land that undermined Native Hawaiian access to natural resources, large-scale conversion of land from subsistence to commercial agriculture for plantations, the overthrow of the Hawaiian Kingdom and colonization by the USA, and the prohibition of cultural practices such as speaking the native language.<sup>52, 53, 54, 55, 56, 57</sup>

The subsequent loss of relationships and vital aspects of the indigenous way of life due to the cumulative effects of such events is referred to by Heart and DeBruyn (1998) as creating a legacy of chronic trauma and unresolved grief across generations.<sup>58</sup> The health statistics of Native Hawaiians outlined above may be evidence of this traumatic legacy.

Corntassel (2008) however, argues that indigenous people can begin to “[assert] visions of self-determination on their own terms to start remembering the qualities of [the] ancestors and act on those remembrances.”<sup>59</sup> Also called sustainable self-determination, this concept suggests that self-determination can be achieved by reconnecting with the wisdom of ancestors through traditional cultural practices, emphasizing an approach that supports indigenous economic independence, spiritual regeneration, and social health through the restoration and regeneration of indigenous livelihoods and territories.<sup>60, 61</sup> According to Corntassel (2008), critical discussions regarding the reclamation of indigenous territories, livelihoods, natural resources, and the regeneration of indigenous languages and culturally based practices might serve as a way for individuals to develop resilience to draw on for protection against economic and health disparities.<sup>62</sup>

Such a response to the disintegration of Native Hawaiian social structures and values is illustrated by the Hawaiian cultural awakening of the 1970s, igniting efforts to strengthen cultural identity and serving to bolster the social well-being of Native Hawaiians.<sup>63</sup> It has helped Hawaiians to reclaim and redefine their culture and identity as seen through the spread of Hawaiian music, the revival of *hula kahiko* [traditional Hawaiian dance] and male hula dancing, a resurgence in the practice of traditional arts and crafts, the growing number of clubs and individuals involved in *hoe wa’a* [canoe racing], and the number of clubs and individuals dedicated to revitalizing traditional Hawaiian values and practices such as *lua* [Hawaiian fighting art], *hale* [traditional house] building, *kalo* [taro] farming, and *loko i’a* [aquaculture], to name a few. Other examples of this cultural resurgence include:

- The effort initiated by young Native Hawaiian leaders from Molokaʻi to reclaim the island of Kahoʻolawe from the U.S. Navy.
- The protection of cultural *kīpuka* [a calm and safe place], traditional centers of spiritual power where Native Hawaiian beliefs and practices were able to develop and persist long before Western and Christian influences. A few of these centers across the islands were able to survive urbanization and industrialization after Hawaiʻi was occupied by the U.S. and have provided the safe space to pass on cultural and spiritual knowledge and practices.<sup>64</sup>
- The global presence of hula—there are more than 967 *hālau hula* [schools of traditional Hawaiian dance] worldwide with at least 187 in Hawaiʻi, 557 in the continental U.S., and 223 in other countries around the globe.<sup>65</sup>
- The development of Native Hawaiian charter schools using place-based learning, Hawaiian language, hula, *oli* [chants], and a rigorous, integrated math, science, and reading curriculum.<sup>66</sup>
- The re-learning and resurgence of traditional Polynesian voyaging using ancestral knowledge of navigation to sail outrigger canoes across oceans, establishing global indigenous leadership for Native Hawaiians.<sup>67, 68</sup>

The following assessment of the potential effects of CBSFA implementation includes an examination of how greater local control of natural resources, and connection to ancestral methods of managing those resources, could assist or hinder the restoration of balance among physical, social, cultural, and spiritual forces that provide the foundation for a healthy indigenous community in contemporary Hawaiʻi.

# ASSESSMENT OF THE HEALTH IMPACTS OF CBSFA

## Native Hawaiian Perspective on Health

The “Hawaiian psyche and identity is partly derived from belonging to the land itself.”<sup>69</sup> Changes in land and natural resources impact Native Hawaiians in essential ways, given the centrality of the *‘āina*, commonly translated as “land” but literally meaning “that which feeds.” McGregor et al. (2003) assert that for Hawaiians, well-being is synonymous with an organic relationship that bonds humans to the land and is expressed in a people-environment kinship, as opposed to a contemporary Western relationship characterized by stewardship.<sup>70</sup> Traditional ecological knowledge and traditional resource management stem from the belief that there is no separation between the people and their environment.<sup>71</sup>

The concept of *‘āina* within a Native Hawaiian worldview is fundamentally different from a Western definition of land as a location or geographic place that can be owned, sold, or bargained with as a commodity. According to Kanahele (1986) and Rezentes (1996), *‘āina* has three dimensions: physical, psychological, and spiritual.<sup>72, 73</sup> The environment embodies physical *‘āina*, marking both ancestral homelands and the substance required to nourish the body. Psychological *‘āina* is related to mental health, particularly in regard to positive and negative thinking. Spiritual *‘āina* speaks to daily relationships between Native Hawaiians and the spiritual world. Traditionally, the spiritual world has been—and continues to be—a source of great guidance and strength for Native Hawaiian people. Casken (2001) points out the need for Native Hawaiians to protect the land and the ocean, as these aspects of *‘āina* are essential to their health.<sup>74</sup>

The Native Hawaiian concept of self is also grounded in social relationships and tied to the view that the individual, society, and nature are inseparable and key to psychological health.<sup>75</sup> Positive relational and emotional bonds are expected to support and protect each member of society, which in turn can promote psychological well-being.<sup>76</sup> However, if these same relational bonds are out of balance, it can be harmful to the individual, community, or nature, and can result in maladaptive behaviors, psychopathology, and/or societal dysfunction. Native Hawaiian health requires a sense of harmony of the following elements: mind, body, family, spirit, and land,<sup>77, 78</sup> as illustrated in Figures 2 and 3 below.



## Ho‘oulu Lāhui Aloha *Raising a Beloved Nation*

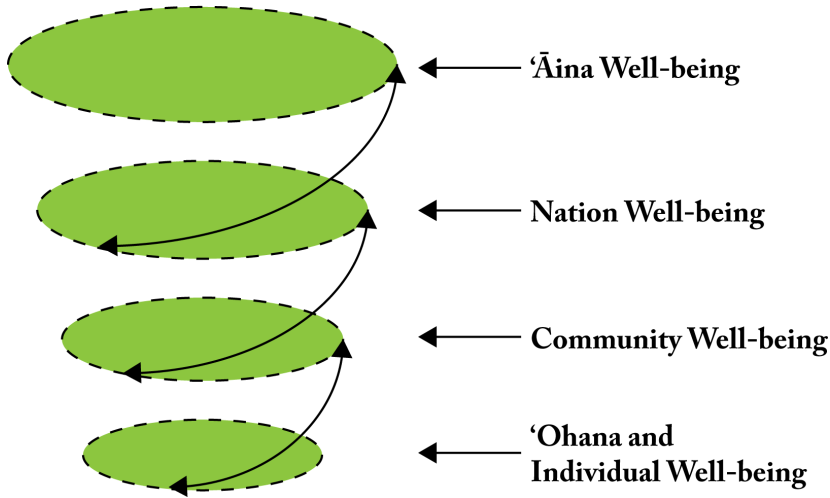


Figure 2. Ho‘oulu Lāhui Aloha: Raising a Beloved Nation.<sup>79</sup>

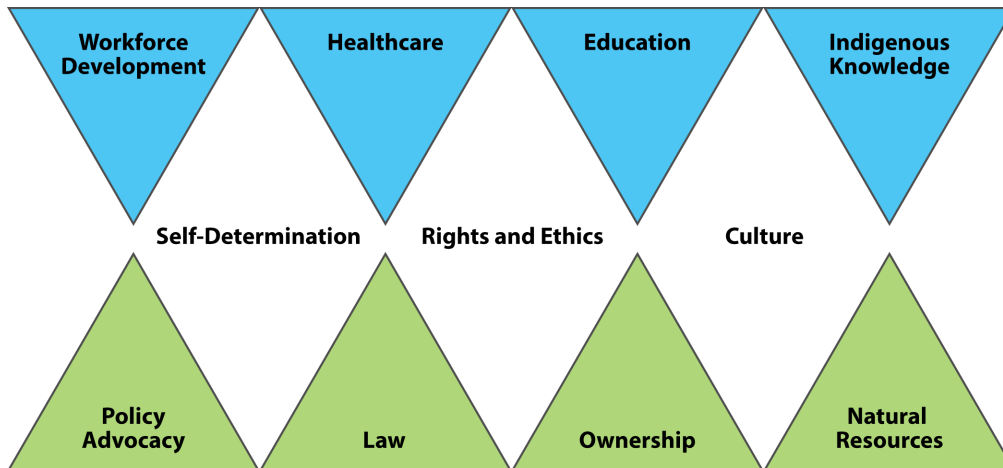


Figure 3. *Kalamakua*, A guiding light towards a re-alignment of *pono*, Native Hawaiian Health and well-being.<sup>80</sup>

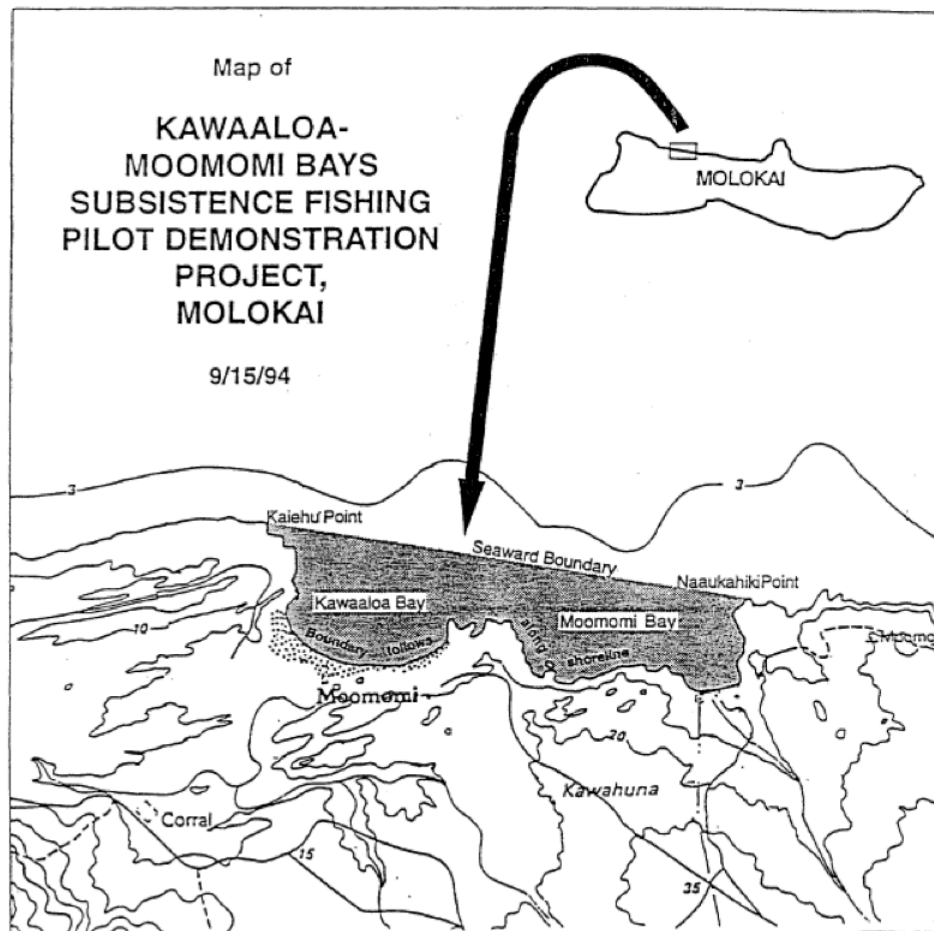


Figure 4. Map of Kawa'aloa-Mo'omomi Bays Subsistence Fishing Pilot Demonstration Project on Moloka'i.<sup>81</sup>

Mo'omomi faces challenges from both outsiders and some Moloka'i residents who disregard or are unaware of traditional practices for accessing and utilizing the fishery. The proposed CBSFA policy provides a vehicle to address these challenges by making it possible to formally integrate local knowledge into state-recognized marine protection practices. Such recognition of traditional practices through the CBSFA policy could help ensure the maintenance of Mo'omomi as a cultural kīpuka, which may in turn impact ecosystem and community health.

The following assessment lays out the possible impacts of the CBSFA policy on the four determinants of health identified in the scoping process noted above:

- Self-determination and control over resources
- Ability to practice traditional marine activities and transmit traditional practices to subsequent generations
- Ability to access fish/marine resources for family and community subsistence
- Effects on commercial marine resource sales and fishing incomes.

It is important to note, however, that while discussion is divided into four sections for purposes of clarity, these determinants of health and their potential impact are not entirely separable, given that mental, cultural, physical, societal, and environmental health in the Hawaiian context are deeply intertwined.

## **Assessment Methods**

The assessment process combined data from existing research, community surveys and reports, transcripts from two community meetings facilitated by Sust'ainable Molokai, and interviews of Moloka'i residents, Ho'olehua Homesteaders, public health officials, landowners, fishers, and community organizers on Moloka'i. Commercial fishers and some of their trade organization representatives were also consulted, as were representatives of DLNR.

A core group of researchers contributed to the HIA findings, including:

- **Malia Akutagawa, Esq.**, Assistant Professor of Law, Hui 'Āina Momona, University of Hawai'i at Mānoa, William S. Richardson School of Law - Ka Huli Ao Center for Excellence in Native Hawaiian Law, Hawai'inuiākea School of Hawaiian Knowledge
- **Tressa P. Diaz, MSW**, Lecturer, Myron B. Thompson School of Social Work, University of Hawai'i
- **Clare Gupta, PhD**, Assistant Public Policy Specialist, UC Cooperative Extension, Department of Human Ecology, University of California, Davis
- **Angela Fa'anunu, PhD, MSPH**, Environmental/Community Planning, Townscape, Inc.
- **Shaelene Kamaka'ala, Esq.**, Research Specialist, Hui 'Āina Momona, University of Hawai'i at Mānoa, Hawai'iuiākea School of Hawaiian Knowledge
- **Maile Tauli'i, PhD, MPH**, Assistant Professor, Native Hawaiian and Indigenous Health, Department of Public Health Sciences, University of Hawai'i at Mānoa

Organizational stakeholders who contributed key information for the HIA process include:

- **Noa Emmett Aluli, MD**, Medical Executive Director, Moloka'i General Hospital
- **Jack Kittinger, PhD**, Conservation International Hawai'i
- **Davianna Pōmaika'i McGregor, PhD**, Professor, College of Social Sciences, University of Hawai'i at Mānoa
- **Mac Poepoe**, Konohiki, Hui Mālama o Mo'omomi
- **Erin Zandre**, Community Based Subsistence Fishing Area Planner, RCUH Contractor, Hawai'i Division of Aquatic Resources, DLNR

To establish a sense of the community's voice, open-ended interviews were conducted with Moloka'i residents ranging in age from 23 to late 70s. Potential participants were identified through purposive sampling based on referrals from key individuals and organizations with expert and/or relevant information for the project. A chain referral method, known as snowballing, followed in which interview participants identified others for consideration. Sampling was in no way random: approximately eighteen residents of Moloka'i were selected and interviewed in April 2015, of which the majority were from Ho'olehua (north), one from the west side of the island, one from Kaunakakai, and three from the eastern side of the island. Most participants were farmers and fishermen. Due to its rugged terrain, Mo'omomi is mostly accessed by men; therefore, the majority of participants were males and only three female participants were included. Three participants worked directly within health-related fields. Participants gave consent for their interviews to be recorded and transcribed.

Although the interviews were open-ended, a set of questions was used to ensure that the relevant topics were covered in the one-and-a-half to two-hour timeframe. These questions are listed in Appendix A and covered specific themes, including a participant's personal background, the potential impact of a CBSFA policy on cultural practices associated with Mo'omomi, sustainability and food security, intergenerational knowledge transmission, fish consumption and the sale of fish, and human health. A short, closed-ended questionnaire was distributed to gather additional information about each interview participant. The survey consisted of nine questions and addressed dietary habits, dependence on fish for subsistence and for household income, the source of fish consumed at home, whether participants access Mo'omomi for fish and for what purpose, changes observed in fish consumption over time, self-perception of health, and the value of subsistence to participants.

To reach commercial fishers, The Department of Land and Natural Resources contacted those fishers statewide who had reported fish catch from Mo'omomi in the five years between 2010 and 2014. Approximately 53 commercial fishers were identified, notified via e-mail of the HIA project's purpose, and were twice invited to participate in the study. However, only one commercial fisherman from O'ahu responded and participated. A limited number of commercial fishermen live on Moloka'i and one of these fishermen agreed to be interviewed in-depth for this project.

### **Health and Welfare Indicators**

Note that the health and welfare indicators cited below are not consistent in terms of the geographic area for which selected inferences are made. The authors had to use some statewide data about Native Hawaiians, some data specific to Moloka'i but not to Native Hawaiians in particular, with a small amount of data pertaining just to Ho'olehua

Homestead. Because residents of Molokaʻi as a whole and in the area around Moʻomomi Bay are predominantly Native Hawaiian, we are reasonably certain that our extrapolations are appropriate for the discussions and conclusions in the assessment.

## **Assessment Findings**

### **Self Determination and Control Over Resources**

*“The Hawaiian of old found in the sea an important source of foods and some raw materials for his tools, utensils, ornaments, and other things. When these were combined with the resources of the ʻāina, he was assured of economic self-sufficiency...But in order to achieve that security, two further things were necessary: the first was free, unconstrained access to the sea; and the second was the right to exploit the sea exactly in accord with his right to exploit the land. Hence, the ahupuaʻa, with its extensions into the sea as far as two or three miles out from the shore, fulfilled these conditions, and served for centuries as the basis of the Hawaiians’ land-use system. It is not surprising, therefore, to hear Hawaiians today still talking about the value of the ahupuaʻa, partly out of nostalgia and pride in its effectiveness, but also partly out of a real concern for maintaining their traditional relationship with the land-sea continuum.”<sup>82</sup>*

As noted above, the CBSFA policy enables a mechanism for co-management of nearshore marine resources for communities in close proximity to these fishery areas and establishes a process by which communities can, in conjunction with DLNR, develop rules and management structures they deem to be effective in protecting those resources for subsistence and, by implication, long-term sustainability.

A direct link between access to and control over culturally significant resources, and personal and community well-being, is taken for granted in Native Hawaiian tradition. “Throughout history, the Hawaiian people have maintained a deep abiding faith in the land and its power of providing physical sustenance, spiritual strength, and political empowerment.”<sup>83</sup> As explained above, in traditional Hawaiian conceptions of health, personal harmony and well-being are deemed to stem from one’s relationship with the land, the sea, and the spiritual world. Imposed detachment from nature and the spiritual world creates a sense of marginality, helplessness, and alienation.<sup>84</sup> For example, data show that Hawaiians have high rates of alcohol and substance abuse, suicide among young adults, child abuse, psychological disorders associated with social problems, school adjustment problems, and adults entering prison. These problems are associated with socioeconomic conditions resulting from a lack of access to, and control over, a wide range of basic resources.<sup>85</sup> It is not surprising, then, that during the initial community scoping meeting, participants identified autonomy and the ability to make one’s own

decisions about access to, and management of, resources as a key component to their overall health and well-being.

Evidence of the links between control over resources and mental health exists not only in the Native Hawaiian context, but within other indigenous populations as well. Many indigenous groups believe that the devastation of their lands through globalization, commercial exploitation, and climate change is equivalent to a physical assault. One researcher stated that “Damage to the land, appropriation of land, and spatial restrictions all constitute direct assaults on the person.”<sup>86</sup> The widespread destruction of the environment through commercial developments could be understood as threats to indigenous people and communities that are equivalent in seriousness to the loss of social role and status in a large-scale urban society.<sup>87</sup> Western psychological Self-Determination Theory also posits that mental health, positive motivation, and personal development are supported by a sense of connectedness, the ability to achieve one’s own goals, and autonomy.<sup>88, 89, 90, 91, 92, 93</sup> Consequently, self-motivation and mental health can be diminished when these needs are compromised.

Community consultations and interviews indicated that in addition to the ability of communities to devise rules for the management of fisheries at Mo‘omomi, *kuleana*—the Hawaiian value that connotes a sense of responsibility—was another important component of establishing a CBSFA. Thus, findings suggest that having autonomy and practicing *kuleana* are part of a sense of self-determination, which in turn is linked to greater mental health and well-being. The following section describes in more detail how each of these measures is defined and viewed by community members of Moloka‘i.

### ***Autonomy***

Interviews with community members confirm the sense that the ability of communities to devise rules for the management of fisheries at Mo‘omomi would enhance mental health through autonomy in the “satisfaction of charting your own course” and having control over what happens in life. Here we use the word and concept of “autonomy,” defined as “the quality or state of being self-governing; especially the right of self-government.”<sup>94</sup>

A Ho‘olehua resident explained:

[The ability to devise our own rules] gives us a sense of being in control and sense of how we can actually plot our own future. It gives us the feeling of that power. If you can plot the future of Mo‘omomi, you can plot the future of the whole thing... it is not mentally good to be sitting there watching everything crumble [deterioration of resources] before your eyes and have no power to correct it...It’s not sovereignty from a government of some



kind. [It's] sovereignty inside. Sovereignty in your hands. It's sovereignty in your feet. You go where you like go. You make what you like make... Mentally, that's so important yah? Nobody likes to just have no control over [their life]. Like being in the military, you have no control over your life. Mentally, that's critical. Outside of making all your decisions, you feel so helpless.

This individual explained that witnessing the deterioration of marine resources and being unable to intervene in the process creates feelings of hopelessness. The *kama'āina* [native, long-time resident] above also said that the ability to devise rules for the management of fisheries at Mo'omomi not only creates greater control, but is also accompanied by kuleana. Several individuals elaborated on the value of kuleana being tied to feelings of empowerment and *mālama*, which implies caring for and protecting.

### ***Kuleana***

A taro farmer who fishes occasionally shared that kuleana is an important value because it creates feelings of empowerment and of ownership. He explained the relationship between the terms in his own words:

“Empowerment I think can also be defined as kuleana. It empowers somebody and it enables them to take action—whether it is in the frontline throwing ‘*ike* [knowledge] or in the back scenes doing research or legislation or whatever. Empowerment is allowing them to claim ownership of what is rightfully theirs in a *pono* [right] way. You get “‘*ai pono*” [eat right] and then you get “‘*ai 'ono*” [eat what you like].” So, you could go into an area and you can take, take, take because you ‘*ono* [crave or relish] for this OR you know how to do it the *pono* way because it's breeding time. It's *kapu* [prohibited] time. So, empowerment in the right way. It's love.”

A regular fisherman at Mo'omomi added that people on Moloka'i and from Ho'olehua take pride and satisfaction in caring for their place. He explained: “If had people take a little bit more ownership and responsibility...I see this mostly as kuleana on our part, not necessarily stopping people from coming our way because actually, we [people of Moloka'i] are the main problem. We use the place the most.”

Another Ho'olehua resident believed that allowing the community to devise rules for the management of Mo'omomi provides opportunities for the people of Moloka'i to take responsibility, adding that the right to devise rules comes with the responsibility to take care of the resources being governed:

“It’s a responsibility for Moloka‘i to support and really get to do community-based management...with the rights come the responsibility...I think that our communities are so subsistence-oriented; it would send a message to the community who grew up there, still buried there, parents, grandparents, buried there, that had relationship with the land.”

From this perspective, the right to make decisions and manage resources (autonomy and authority) comes with responsibility and a sense of accountability and care. The indigenous concept of kuleana is thus different from a western worldview of ownership, in which control and care can be separated.

### **Traditional Marine Resource Management and Transmission of Ancestral Knowledge**

*[W]hen Hawaiian fisheries (from mountain streams to deep sea) were managed under the old system—including the kapu periods in which fisheries were rested...and at times severe penalties for infractions on the kapu and kānāwai—the fisheries were capable of sustaining hundreds of thousands of residents and fisher-people. The foundational component of the native relationship with fisheries and harvesting of resources, was that the kānaka and their environment shared a familial and religious relationship. Each person bore responsibility for his or her actions. This concept is personalized and is expressed in Hawaiian life as “Mālama i ka ‘āina, a mālama ka ‘āina iā oe!” [Care for the land, and the land will care for you!]. The saying is also expressed as “Mālama i ke kai, a mālama ke kai iā oe!” [Care for the ocean, and the ocean will care for you!]<sup>95</sup>*

In contrast to the previous pathway of having the control to self-govern traditional activities, this pathway relates to the health impacts that come from the act of participating in a traditional activity itself. Proponents of CBSFA designation have emphasized that cultural food security—meaning that residents have ways of obtaining food that maintains cultural and social ties while also satisfying their family’s nutritional needs—is critical not only for the physical health of Native Hawaiians, but also for their overall well-being.

Socioeconomic indicators such as income, education, employment, living conditions, social support, and access to resources ranging from food provisioning to health services are factors that contribute to health. These factors certainly apply to the health of indigenous populations. Indigenous health is further affected by a range of cultural and sociopolitical factors, including racism, along with various indigenous-specific factors including loss of language and connection to the land, environmental degradation, and the resulting spiritual, emotional, and psychological disconnection. Being isolated from

aspects of one's cultural practices is understood to have a negative effect on indigenous health.<sup>96</sup>

Connection to culture, however, might serve as a mechanism of adaptation (resilience) that individuals draw from to protect against trauma and disparity. Serna (2006) found that culture acts as a buffer against stress and allows individuals to better cope with and adapt to their environment, becoming more resilient, adding that having “faith in a cultural worldview, combined with the achievement of the standards of that culture, leads to self-esteem, which in turn leads to lower anxiety and positive adaptive behaviors.”<sup>97</sup> His work with Native Hawaiian children suggests that self-esteem and positive adaptive behaviors are linked to (a) identification with being Hawaiian, (b) the ability to practice Hawaiian core values and beliefs, and (c) restoration of collective cultural pride among Native Hawaiians. Thus, his research among Native Hawaiians indicates that the existence and practice of a cultural identity is key to well-being.

### ***Fishing and Fishery Management Practices and Cultural Identity***

Traditional fishing practices exemplify indigenous knowledge embedded in a value system and a holistic approach that incorporates conscious behavior, awareness of the environment, and attention to details. Hawaiians understood what it meant to be *lawai‘a pono* (responsible fishermen).<sup>98</sup> Poepoe, Bartram, and Friedlander (2003) outlines a fishing “code of conduct” that captures Hawaiian values for *pono* fishing practices: (1) concern about the well-being of future generations; (2) reverence for ancestors and sacred places; (3) practicing self-restraint, i.e., taking only what you need; (4) *lōkahi*, harmony with the ocean and close relationships with all marine life, (5) *mālama*, nurturing good relationships between humans and resources, (6) *laulima*, sharing, cooperating, reciprocity, kinship obligations; (7) *ha‘aha‘a*, not excluding people from nature, reciprocal relationships, and equality; and (8) *‘imi ‘ike*, generational transmission of keen observational skills and knowledge of the life cycle, diet, and feeding habits of marine life.<sup>99</sup> The kapu system was based on these values and knowledge of natural cycles of fish populations, limiting or forbidding harvesting of different fish during specific seasons to ensure cultural perpetuation and a sustainable fishery. Behaviors such as spawning, migrations, habitat preference, and diet fluctuated in response to moon phases, surf conditions, sand movements, temperature shifts, fresh water inputs, and food availability.

Before Western contact, Hawaiians had a thriving subsistence lifestyle within their ahupua‘a. The land and ocean resources were held in trust by the different *ali‘i* [chief]. Each ahupua‘a had a designated konohiki who coordinated stewardship and harvest times, and the *maka‘āinana* [commoners] worked the land according to the konohiki's management.<sup>100</sup> From the mountains to the sea, resources were shared and exchanged between those that lived *mauka*, or mountainside, and *makai*, or oceanside.<sup>101</sup> It was a

complex social system that met the needs of everyone in that ahupua‘a, as well as the needs of nature itself.

Interviews with community members suggest that the ability of communities to devise rules to manage the resources at Mo‘omomi would allow for an even stronger re-emergence of traditional fishery management practices, strengthen the Hawaiian value system, make Hawaiian culture visible and relevant through the re-establishment of traditional codes of conduct, reconnect people with place, maintain social cohesion through the balanced exchange of resources and the sharing of knowledge, preserve natural resources over the long-term, and provide a solid foundation for community well-being and individual health and resilience.

### ***Practicing Traditions of Resource Preservation and Management for Sustainability***

Being able to devise rules modeled after traditional and customary practices of management that were ahupua‘a-based and governed by the konohiki system could change peoples’ habits of fishing in ways that are more oriented to resource preservation. For example, someone who regularly fishes at Mo‘omomi explained that he learned to fish from community leader Uncle Mac Poepoe, who taught him to take “a little bit of everything instead of a lot of one thing at any one time.”

Another Ho‘olehua resident believes in the effectiveness of customary practices because of the success of the ancient Hawaiians in managing their resources. “It worked for kūpuna, so you feel like you’re on solid ground. We had *‘āina momona* [abundance] because we had very strict rules and big consequences.” Others reiterated the statement that using a traditional management model would best maintain the integrity of the resources that support cultural practices:

“The reason why it continued for thousands of years is because it’s successful. The traditional knowledge, although you might look at is as old-fashioned...those limitations are what made that place the way it is. Those limitations gave us what we have, what we enjoyed in our lifetime. Those limitations [are] what I expect to see continue, so that we can continue to have what we have.”

More specifically, community members stated that restoring the traditional and customary practices of fishing through a formal CBSFA process places the responsibility on people to be responsible, be pono fishermen, and to practice core values such as mālama ‘āina, aloha ‘āina, and reciprocity, which are the foundation of the indigenous culture. Another point made was that limiting the number of fish one can catch, as well as the methods used to catch them, might also encourage the concept of reciprocity and interdependence which would, in turn, strengthen community relations. Restoring a

management system that is based upon the moon, the time of year, and the spawning cycles of the fish might encourage greater awareness among fishermen to observe the natural environment and cycle—described by one Ho‘olehua resident as essential for spiritual health.

There were, however, interview participants who felt that restoring traditional methods of marine management at Mo‘omomi might be problematic in several ways. Some were concerned about how the CBSFA rules would be created, who would enforce them, and whether the process would be representative of the will of the whole affected community.

Others pointed out that the area of the proposed CBSFA project is too large to be ahupua‘a-based and suggested that for the concept to truly represent the ancestral model, the CBSFA area needs to be downsized into smaller portions based on traditional land division.

This viewpoint of ahupua‘a being managed autonomously and separately from other ahupua‘a, and that each ahupua‘a is self-sustaining, is generally supported. Historically, however, the Mo‘omomi fishery has always been linked to Pelekunu ahupua‘a. The established custom from ancient times up until the 1940s was that residents of Pelekunu would traverse by foot over sea cliffs or sail to Mo‘omomi during the summer months to gather *pa‘akai* [salt] as well as catch, salt, and dry fish to carry them through the winter months when the surf at Pelekunu was too rough. While many families relocated from north Moloka‘i to the south side to coincide with the many changes occurring in post-contact Hawai‘i and the plantation era, these fishing practices indicate that traditional subsistence fishing rights extended beyond ahupua‘a boundaries. One ‘ohana remaining in Pelekunu maintains its traditional subsistence fishing practices and long connection to the proposed Mo‘omomi CBSFA to this day.<sup>102</sup> The Hawai‘i Supreme Court has accepted that traditional and customary rights may extend to other ahupua‘a irrespective of actual tenancy if it can be demonstrated that this is the accepted custom and long-standing practice.<sup>4</sup> Furthermore, over twenty years of konohiki-based resource monitoring reveals that Mo‘omomi Bay relies on Kalaupapa for resource recruitment, as Kalaupapa “serves as a vital nursery for various fish species.”<sup>103</sup> These ecological and biocultural interconnections among several ahupua‘a that span the proposed CBSFA indicate that a generalized approach to managing ahupua‘a fishery resources separately does not reflect the established cultural practices in the area.

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<sup>4</sup> *Pele Defense Fund v. Paty*, 73 Haw. 578, 620, 837 P.2d. 1251, 1272 ((1992) holding that “native hawaiian rights protected by article XII, §7 [of the Hawai‘i State Constitution] may extend beyond the ahupua‘a in which a native Hawaiian resides where such rights have been customarily and traditionally exercised in this manner.”).

### *Connection to Place and a Sense of Identity*

Mo'omomi, for some, is an area in which there are marine resources to be preserved. For others, Mo'omomi is much more than a resource. In a project-scoping meeting, one Ho'olehua resident who regularly spends time at Mo'omomi expressed this as "when I'm at Mo'omomi I feel like myself."

Consultations with Emmett Aluli, a medical doctor on Moloka'i, clarified that Native Hawaiian identity and culture can be restored through re-establishing relationships with the land. He discussed the restoration of the island of Kaho'olawe following the bombing of the island by the U.S. Navy in the 1970s as an example of how Native Hawaiians reclaimed their culture and their identity by restoring the health of the land and re-engaging with the island. Through that process, the island became a *pu'uhonua* [refuge] for Hawaiian culture supported by Native Hawaiians throughout the islands. In 1982, the annual celebration of the Makahiki in honor of the Hawaiian god of agriculture, Lono, was re-established McGregor (2007) described the significance of these practices:

"The re-establishment of the Makahiki and other Native Hawaiian cultural and religious ceremonies and practices on Kanaloa [Kaho'olawe] was the most significant outcome of the movement to stop the bombing of Kanaloa. These ceremonies and practices reconnected a generation of Native Hawaiians with their ancestors and their soul as a people. The revival of these religious ceremonies deserves special attention."<sup>104</sup>

Dr. Aluli reiterated the value of Kaho'olawe and expressed that the same kind of relationship he has with that island is similar to what is "really happening at Mo'omomi...Land has the potential to heal bodies and heal the spirit, and heal as you would say, even families."

A farmer who does not fish, but likens his traditional practice of farming to the fishing practices of fishers who frequent Mo'omomi, described the healing capacity of the land: "I feel as if being here, it's like a soul retrieval process and I can finally drop all of my identities I've built up as walls around me for so long. And now I can be here and be completely free of anything in which I've attached myself to and solely focus on this work of being here." He likened being able to restore infertile, drylands to healthy farmland that feed families as a healing process. "If this is a reflection of what inside of me looks like, then there's truly hope for healing," he explained. "We need the ocean," he said. "There's no second relationship. [For] island people we cannot separate ourselves from the land or the ocean. We need both sides. It's like saying that you don't need your legs. You don't need your arm," he continued.

Another resident explained, “For us the land is—there’s something about the land that affects us, that [we] keep inside of us and...if you had a good upbringing [there] when you [we]’re young, you will ultimately return to that place. Moloka‘i is like that.”

A twenty-three-year-old Moloka‘i returning resident shared her thoughts:

“I know of my friends that have gone around the globe and have been away from home a long time, but for some reason I feel as if love is one of those things that knows no distance and knows no time. The love of the land and where you’re from is always going to be whispering that to you. It’s up to you [to] actually listen. And trusting that’s where home is...is where there’s also work to be done too...There is something in me—I didn’t play outside as a kid, never touched dirt, was raised to be a musician and artist. And it’s interesting to know that something is—beyond this lifetime for me—inspir[ing] me [to] come home.”

Dr. Aluli, who is from Ho‘olehua, explained that much traditional knowledge and practice has been lost, so there is great value in the ability to go back and participate in observing the different seasons, getting to know the place, and being really open to what’s within a person. He also explained that spending time in nature and observing, “gives you a way of thinking and knowing, what a science is all about, and making the connections to the land, deeper and deeper.” He stated that, “the value of Mo‘omomi to the health of the people is essential.”

This relationship can be seen through the experience of a gentleman who fishes at Mo‘omomi about five days a week. For this resident, fishing at Mo‘omomi is an important part of his day. He loves being able to do that and the practice benefits him spiritually but also mentally and physically. He likened his experience of going down to Mo‘omomi to fish as therapy and described this feeling in more detail:

“THAT [therapy] I really can feel. I can feel that and then what I see, when I see the *‘opihi* [limpet] and I see the *i‘a* [fish], it’s really fun. It’s really fun. If you’re pretty healthy, you going have fun. You’re gonna have a good sleep when you come home. You going have one good meal and everything else around you going be good. People around you just going, ‘cuz, you bring home all this food!’ [Laughs]. It’s so wonderful.”

Just as a connection to place is an important element of positive cultural identity, so is the practice of core Hawaiian values. A kupuna shared several of these Hawaiian values such as sharing, aloha, mālama, kuleana, and reciprocity that are embedded in the traditional lifestyle:

“For Moloka‘i, when we were young, [we] don’t ask questions. You see the older person working, you go over there and you go work too. Just like my brother, he was taught how to pick up *he‘e* [octopus]...and was taught that when you come home with your *he‘e*, you go to the old folk’s house, [and] you give them. You give them, you give them, you give them until you come home with only what your family can eat...We’ll give fish, extend your hand out and we give because in retrospect, they look at you and they’re going to give back [reciprocity]. It may be not something that is tangible, but they give back in the spirit.”

Thus, the act of fishing and sharing one’s catch with the elderly and other family members who cannot fish themselves, provides opportunities for expressing and practicing key cultural values.

#### *Impact on the Ability to Share Wealth in Traditional Ways (Mahele)*

As noted in the comments from community members above, traditions and cultural values have helped members of the Hawaiian community cope with social challenges and unite around a collective identity and aspiration. An indigenous culture that binds together members of the *‘ohana* [extended family] and unites families into a tight-knit community creates a strong and resilient social network.<sup>105, 106</sup> In the face of adversity, Native Hawaiians continue to draw on traditional cultural values to strengthen the social systems that serve as a primary source of support and resolve: family and community. Social support is a key factor that reinforces emotional well-being and provides assistance in times of financial stress.<sup>107</sup>

The traditional system of *mabele*, or sharing, exemplifies such a strong sense of community responsibility among Native Hawaiians. In a study focusing on the ahupua‘a of Hā‘ena in the district of Halele‘a on Kaua‘i’s north shore, Vaughan and Vitousek (2013) studied the multiple linked benefits that stem from sharing fish from a subsistence fishery, which range from maintaining traditional cultural practices, acknowledging the significance of fishers, encouraging a relatively equitable distribution of marine resources and reciprocal exchange of commodities and skills, to strengthening social ties and networks within the community. While sharing with elders was important in honoring their role in preserving and transmitting fishing-related knowledge and values to the present generation, Figure 5 below indicates how widely fish were shared.<sup>108</sup>



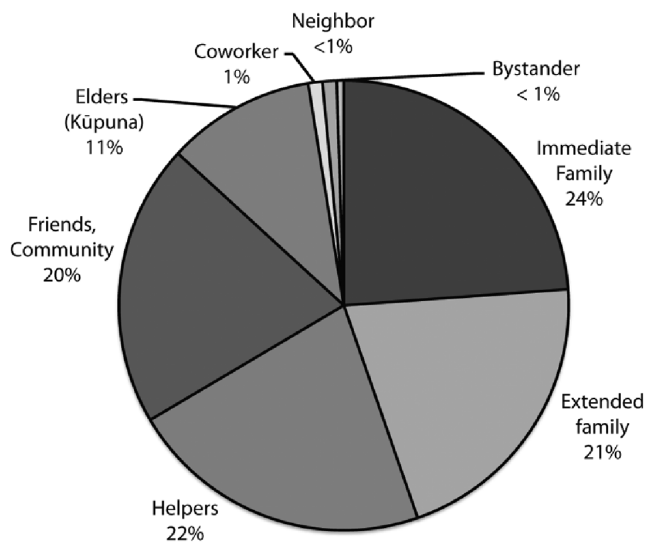


Figure 5. Recipient relationship to fisherman ( $n = 197$ ).<sup>109</sup>

In Hā'ena, the tradition of mahele contributes to community resilience by promoting self-reliance through the process of collective insurance. In return for the fish, the mahele recipients were reported to give back various goods including smoked meat, homemade bread, Filipino food, or fresh mangoes. Overall, this study is relevant for comparing the potential impacts of the CBSFA on Moloka'i.<sup>110</sup> Hā'ena has cultural similarities to the Mo'omomi area and recently received its CBSFA designation, thus serving as a model for other fishing communities across Hawai'i.<sup>111</sup>

It is important to note that this tradition of sharing does not include only commodities, but skills as well. Transmission of skills such as how to make a fishing net or how to cook a culturally significant dish also aid in the preservation of valuable knowledge that enables the community to maintain its culture and identity with place. These informal sharing networks as part of the mahele system may play an important role in lessening the dependence of the community on non-traditional food from commercial sources and act as a form of collective social insurance.<sup>112</sup>

### ***Intergenerational Knowledge Transmission***

As voiced by community members above and research studies from Hā'ena, the practice of traditional marine harvesting and distribution provides opportunities for the transmission of ancestral knowledge, the equitable distribution of resources, the reciprocal exchange of commodities, and the maintenance of a collective form of social insurance. This practice may also have importance not only for the ability of people to maintain their own cultural identities, but also provide the type of natural and social learning environments that are especially appropriate and supportive for Native Hawaiian youth.

A study of the significance of culture-based education by Kana'iaupuni, Ledward, and Jensen (2010) voices the concern that indigenous communities often feel neglected and disconnected in educational systems which discount their beliefs, practices, and knowledge. The research highlights the benefits of including place-based, culturally relevant learning for Native Hawaiian youth, suggesting that integrating cultural values into schooling would have positive impact on the socio-emotional well-being of the students, including their sense of identity, self-worth, family relationships, and community belonging, as well as educational achievements, behavior, and awareness. The strategies and practices found most effective for overall development and well-being of students mirror many of the values and activities mentioned by community members when considering the impact of instituting a CBSFA, including integrating family and community into educational activities; emphasizing a Hawaiian identity with sense of place; offering hands-on, place-based instruction, and service-learning projects that promote community well-being (*mālama 'āina*). The research concludes that the transfer of traditional knowledge itself and traditional ways of transmitting knowledge have the potential to improve student achievement and benefit the mental and cultural health of the younger generations of Native Hawaiians.<sup>113</sup>

This perspective, couched in different terms, was shared in community interviews. Typically children learned from the experience of working alongside their parents and other family members. “That’s the way that thing [knowledge] starts,” said a prominent fisherman from Ho‘olehua. He continued:

“That thing start at home. You learn from your parents. That’s how you learn. You learn from your community. Once your parents teach you, and if they teach you good, your neighbor down the road, they going see you, ‘Oh, that boy, *‘eleu* [quick, alert]. He going fishing...he share his fish.’ They watch you and they see what you do [so] they like come take you [fishing with them]. They always come your house to take you [fishing] and that’s what happened to me. I used to go with everybody.”

People also talked about the style in which they learned: being taught by observing their surroundings, rather than asking questions as is expected in Western schooling. This is reflected in the *‘ōlelo no‘eau* [proverbs] “*Nānā ka maka; hana ka lima* [Observe with the eyes; work with the hands]” and “*Nānā ka maka; ho‘olohe ka pepeiao; pa‘a ka waha* [Observe with the eyes; listen with the ears; shut the mouth (thus one learns)].”<sup>114</sup>

This way of learning was fondly remembered by several of the older participants:

“Probably about five years old, I used to go out with my uncles, and they wouldn’t say anything. You just gotta follow them and look. They don’t say

anything. You have the opportunity to look and help, so I kinda learned that way. Nobody told me. I learned a lot from looking. My parents, they never said too much, so we really had to kinda like look and feel what all that silence was about, and I got some of that now. I'd see my parents when people used to come over, and they just wouldn't say anything. They'd just listen and it was like that."

Recollections from Uncle Mac Poepoe, the modern *konohiki* of Mo'omomi, also reflect this way of learning through observation, and learning by doing. He recalls the learning process as having to hold the bag while his elders fished. For a long time he was not allowed to fish until his elders were satisfied that he understood the appropriate ways of fishing and caring for the resources. Even in adulthood as he continues to learn by observing the resources daily at Mo'omomi, he is amazed by the different layers of wisdom contained in the practices of his *mākua* [parent generation] and *kūpuna*. For him it is a process of rediscovery. He understands now why his *mākua* and *kūpuna* observed certain protocols—things that were not explained to him, but shown. For example, he observed his elders releasing the largest *moi* fish from their catch. In his youth, he lamented having to release the largest fish. But now he understands that the large ones are the most reproductively mature and will ensure greater abundance and sustainable fish populations for successive generations.

When asked about whether he is confident that the next generation of fishers will be able to manage the resources the way he does, Uncle Mac responds, "I taught my sons the right way. I taught many *keiki* [children] over the years—a whole new generation of pono fishermen—who now have their own *keiki* and are teaching them how to *mālama* too."

From another standpoint, the ability to transmit Hawaiian knowledge and practices to younger generations could also be beneficial for the mental, cultural, and spiritual health of the older population. This positive recognition of the value of one's knowledge is associated with generativity, the ability to actively engage in productive activities and provide guidance to the younger generation.<sup>115</sup> Several studies have attributed generativity to be one of the most influential factors for achieving a sense of well-being and satisfaction at older ages.<sup>116, 117</sup> On the other hand, lack of ability to pass on knowledge and wisdom may lead to disengagement and stagnation. As Cheng (2009) explains, "In today's rapidly changing world, older people may be seen as having little to offer to the problems and issues faced by younger people, and their role as keepers of traditional wisdom is greatly diminished."<sup>118</sup>

A heightened sense of such disparity may be characterized by widening intergenerational gaps in education and life experiences. Culture-based education relating to fishing practices and traditional resource management can be an important pathway to ensure

the reciprocal relationship between generations, to the benefit of both age groups, much like the example of the way the Polynesian voyaging organizations have preserved and passed down their traditional knowledge of navigation. Maintaining this knowledge transmission is valuable for all generations, as it would contribute to their sense of empowerment, self-worth, and pride in accomplishment.

A kupuna interviewed about his connection to Mo‘omomi expressed satisfaction from being in the outdoors engaging in an activity he enjoys and from being able to provide food for his family through the traditional practice of fishing. He recalled that his parents used to do the same and explained that he continues the practice by passing on that knowledge to his granddaughters. He reminisced:

“I remember those things: my parents bringing home food, and being the oldest, and [with] all these siblings [to provide for]. It was kinda like, ‘Wow!’ So all those things, today, I still feel that. I’m still practicing that. I can see my granddaughters and I tell them, ‘go get this, go get that, go gettum over there.’ Now is the time for go get that. That’s all the kine stuff that over the years that I been practicing, just to get food on the table and I think that is so healthy...a lot of families like me do that.”

A fisherman in his thirties who frequents Mo‘omomi and who has young children shared his experience of being able to pass on knowledge and skills to his own children:

“For me, I’m proud. My oldest son [who is a teenager], if I tell him to go down and go get some fish, he can do that already, so I’m happy about that.”

Community-based support for this perspective on the value of intergenerational knowledge transmission, and its relationship to Mo‘omomi and Moloka‘i more generally, was expressed in an initial scoping meeting with Dr. Lorrin Pang, a public health physician serving Maui County. In discussing his concern for youth on Moloka‘i who had relatively few options for positive after-school experiences, he believed that encouraging young people to engage with adults in traditional nearshore fishing activities would provide youth with healthy physical activity and connections to people and place that could build their resilience and sense of achievement in the face of potential adversity and/or temptation to spend their time in less constructive pursuits.

Most of the community members who chose to attend the health impact assessment scoping meeting were older adults who expressed both the desire to, and the importance of, passing on their ancestral knowledge to younger members of the community, while

the youngest adult in the room made it clear that she had returned to Molokaʻi in order to learn and preserve this knowledge.

It is worth mentioning here that Hui Mālama O Moʻomomi has been conducting the kind of educational programs suggested by these findings, including:

- Summer sessions for students from Kualapuʻu Elementary School, teaching keiki through hands-on learning experiences about plants and restoring the native vegetation, the importance of protecting the restoration areas and areas with native plants, the damaging effects of erosion and how to control it, archaeological sites, and cultural connections to the land and how changes on the land affect the ocean. Classes included hands-on ethno-math lessons including how to do traditional monitoring and calculate what an allowable take should be.
- A summer dive program for *ʻōpio* [youth] was conducted to teach kids safe and appropriate diving techniques, as well as educate the next generation about how to conserve and mālama marine resources.
- Moon cycle and place-based ahupuaʻa curriculum for Molokaʻi High School and a culture-based science curriculum for the Molokaʻi Hawaiian Language Immersion Program, O Hina I Ka Malama. Qualitative and quantitative results from the study of the effects this science curriculum had on the students showed that students were more interested and had an improved attitude in attending school, their test scores increased, and they learned about the marine invertebrates of Molokaʻi.<sup>119</sup>
- Summer Moʻomomi ʻohana lawaiʻa camps, held in partnership with Conservation International Hawaiʻi and Tri-Isle Resource Conservation and Development, that encouraged participation of multiple generations to perpetuate cultural practices by inspiring ʻohana to mālama ʻāina. The participants included Hoʻolehua Homestead families and included toddlers, children, youth, adults, and kūpuna in their seventies.
- The Hui also continually hosts and conducts teaching tours and workshops for off-island groups, Kamehameha Schools' Hoʻolauna Program, and schools of pre-university to university students.

### **Access to Marine Resources for Family and Community Subsistence**

In examining the potential health effects of adopting CBSFA rules for Moʻomomi, we look at the ability of local Hawaiian families to consume its resources, inferring that the stabilization or increase in the area's marine resources translates into greater ability to harvest and distribute those resources. This section discusses how CBSFA policy might impact fish stocks, returns to how local catch might be distributed, and then examines

the potential impact of seafood consumption and fishing activity on family food security and physical health.

### *Links Between Traditional Resource Management and Ecosystem Health*

Declines in reef fish stocks in the Pacific Islands are attributed to overexploitation of reef species, the use of damaging and overly-efficient fishing practices, and environmental degradation, which have been exacerbated by inadequate knowledge and poor management practices.<sup>120, 121</sup> The inability of contemporary science-based management regimes to mitigate problems of resource exploitation and overutilization has rekindled interest in traditional methods of marine resource management, particularly in the Pacific Islands.<sup>122</sup>

Moving away from commercial fisheries and concentrating on subsistence fisheries has been suggested as a strategy to address these problems;<sup>123</sup> in recent years, there has been a revival of traditional resource management systems in Oceania.<sup>124</sup> This renaissance has been credited to the recognition of dwindling resources, ecotourism potential of reefs, renewal of cultural pride, and renewed authority of customary laws and leadership in the decades following independence.<sup>125, 126</sup> The use of co-management between central governments, fisheries authorities, and fisher communities are often important ingredients in strategies to conserve inshore fish stocks.<sup>5, 127, 128, 129</sup> Studies also suggest that nationally imposed fisheries regulations are likely to be ineffective unless there is community support and participation.<sup>130, 131, 132, 133, 134</sup> Therefore, community-supported marine protected areas within a community's usual or traditional fishing area may be critical to the overall health of that marine ecosystem.

Community consultations indicated that residents believe in the effectiveness of customary practices in maintaining the integrity of marine resources because of the success of the ancient Hawaiians. "It worked for our kūpuna, so you feel like you're on solid ground. We had 'āina momona because we had very strict rules and big consequences," explained a Ho'olehua resident.

Marine resources along a twelve-mile length of wave-exposed coast on both sides of Mo'omomi Bay are mainly harvested by a community of Native Hawaiians who reside in the nearby Ho'olehua Hawaiian Homestead. Concepts related to "sustainable use" of

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<sup>5</sup> For example, in a study on Community Supported Fisheries (CSF) and their impact on sustainability of marine ecosystems, L. McClenachan et al. (2014) found that consumption of seafood distributed by CSFs provided economic and environmental benefits to coastal communities. The study noted that a significant difference between CSFs and commercial fisheries supplying supermarket chains was the presence of highly abundant fish stocks in seafood distributed by CSFs. The paper also identified some ways in which CSFs may mitigate adverse environmental impacts, which include bycatch utilization (marketing locally abundant stock which are usually discarded after being caught incidentally) and waste reduction (supplying otherwise disposable portions such as fish heads or roe). See endnote 139 for full citation.

resources, which form the knowledge base of modern environmental sciences, have long been a part of the way of life of traditional communities such as those around Mo‘omomi.

In fact, a study by Friedlander et al. (2002) showed that fish biomass in Mo‘omomi Bay and its adjacent coastal waters was between three to five times higher than other similar north shore locations in the Hawaiian Islands, as shown in Figure 6. Certain species were also larger and more abundant. Based on these findings, the study concluded that reef-fish resources in the vicinity of Mo‘omomi Bay are very healthy and in much better condition than other areas around Hawai‘i.<sup>135</sup>

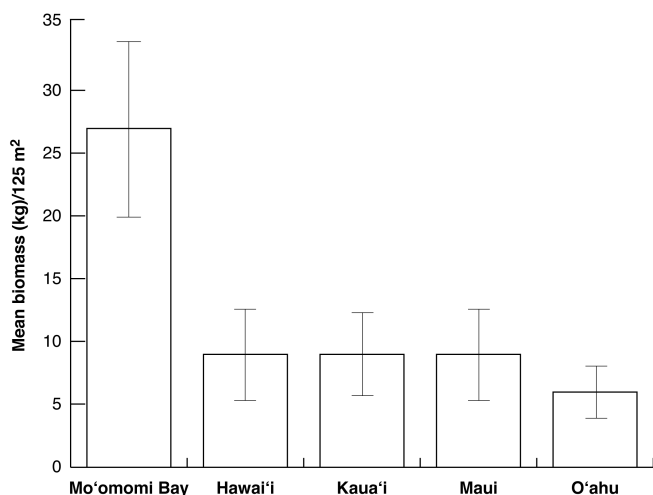


Figure 6. Fish biomass in Mo‘omomi Bay compared to other similar north shore sites in Hawai‘i.<sup>136</sup>

Greater fish biomass at Mo‘omomi Bay compared to the rest of Hawai‘i was attributed to the geographic isolation of Mo‘omomi and the strong conservation ethic of community members surrounding Mo‘omomi who practice a code of conduct based on traditional Native Hawaiian concepts of resource management. These cultural protocols were guided by the traditional Hawaiian moon calendar that highlights specific biological cycles and ecological processes such as fish spawning, aggregations, and feeding habits. An understanding of the biological and ecological context of the moon calendar informed the proper times for harvesting of certain species to allow fish to reproduce.<sup>137</sup>

Educating Moloka‘i youth that they have responsibilities and rights for marine resource use was identified as the most effective way to elicit proper fishing conduct and behavior. Friedlander et al. (2000) also highlighted community participation and involvement as a key contributor to enhanced local marine resource management observed at Mo‘omomi, made possible through the revitalization of Native Hawaiian protocol regarding the use of marine resources.<sup>138</sup>

Subsistence fishing practices formalized by the CBSFA policy could thus aid in conservation of marine resources. More specifically, implementing the CBSFA policy may help diversify the catch by discouraging overexploitation of few high-value species.<sup>139</sup> This would not only help reduce pressure on a single species for harvesting, but also encourage consumers to eat locally available fish,<sup>140, 141</sup> thereby reducing their dependence on food imported from elsewhere. By putting into effect rules and protocols that refrain from employing potentially destructive methods for fishing such as hook-and-line gear, community-based fisheries such as Mo‘omomi may play a pivotal role in maintaining a sustainable and healthy marine ecosystem, assuring long-term availability of marine resources for community harvest.<sup>142</sup>

Evidence suggests that implementing the CBSFA law could help to maintain or even improve marine health, with an indirect potential impact on human health: it may maintain or enhance the ability of Moloka‘i residents to consume fish as part of their diet. This is supported not only in research literature,<sup>143, 144</sup> but also from the viewpoints of Moloka‘i residents themselves, as described below.

Many of the community members interviewed believe that the ability of communities to devise rules to manage the fishery at Mo‘omomi will increase fish consumption due to greater fish availability as a result of better management through traditional methods. Participants believed that traditional methods of community-based management of resources are more effective at protecting resources than current state-managed initiatives. While one resident agreed that the CBSFA initiative would lead to more people on Moloka‘i eating fish because more fish will be available through better management, he highlighted the importance of compliance to the rules of the CBSFA: “If they [the people] comply with the rules, guaranteed, they going eat more fish ‘cause going have more fish.”

#### ***Availability of marine resources for community food security on Moloka‘i***

Two different rural economies continue on Moloka‘i: a cash economy and a subsistence economy. Moloka‘i residents define subsistence as the customary and traditional use of wild and cultivated renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, transportation, culture, religion, and medicine; for barter or sharing; and for customary trade.<sup>145</sup> Results from the 1994 Moloka‘i Subsistence Study show that among a random sample group surveyed across the entire island, 28 percent of the food was acquired through subsistence activities; among the Hawaiian families surveyed, 38 percent of their food was acquired through subsistence activities.<sup>146</sup> Seventy-six percent of the respondents ranked subsistence as very or somewhat important to their own families, and virtually every respondent believed that subsistence was important to the Moloka‘i lifestyle. As one island resident articulated, this means “we are very clear that preserving our natural resources [is] most essential to the viability of our



communities.” Identified subsistence living practices on Moloka‘i are fishing/diving, ocean/shoreline gathering, fishpond/aquaculture, hunting, stream gathering, and land/forest gathering.<sup>147</sup> A subsequent study by Hui Mālama O Mo‘omomi in 1995 found that subsistence activities, including farming and fishing, supplied about one-third of the food needed by the approximately 1,000 Hawaiian residents living near Mo‘omomi.<sup>148</sup> A subsequent study completed on Moloka‘i in 2012 confirmed the ongoing importance and extent of subsistence practices on the island.<sup>149</sup>

Community consultations reaffirmed that family food security on Moloka‘i depends upon access to natural resources such as those within the Mo‘omomi marine ecosystem. For example, one Ho‘olehua resident concurred that two economies exist on Moloka‘i and explained that the two economies give people choices:

“We can either go full-on like every other island and say, hey, we’re gonna learn how to make a lot of money and become millionaires. That’s the dream they teach you in high school. We gotta be a millionaire and [that makes] you successful. Moloka‘i—we balance the dream [with] quality of life. Being rich...have no damn quality of life. So we have an ability to choose right now. That’s a really good position to be in. We don’t have to go to buy lobster—we cannot afford anyway—we can just go get ‘em. Today, we’re saying [with our rules] we can get two [lobsters] each. We can get two each every day, so hey, that’s good enough for me. But, we might not realize what I’m saying, that we have two economies, but [we] fight to protect our ability to feed ourselves.”

He explained that having two economies is important in a time where healthy food sources are threatened. Therefore, healthy ecosystems like Mo‘omomi are critical sources of healthy food:

“Nobody wants to eat beef anymore. They don’t trust what’s in that beef, who’s feeding them, and the way that they feed them—[the] environmental harm with these huge feedlots with all that kine stuff. But wild animals, you can eat. They’re good. [W]hat’s on the land and [in] the sea...we have to protect them, keep those things...Moloka‘i has the ability to do that, so Moloka‘i is in a better position than anybody [else] to figure out what we going do in the future.”

Virtually all of the community participants interviewed were proud of the subsistence lifestyle on Moloka‘i, and most believed that community-based management of Mo‘omomi and places like Mo‘omomi is a step in the right direction to ensure that the

resources necessary to support a subsistence lifestyle are protected, particularly for future generations.

### *Seafood Consumption*

As noted earlier in the community profile, Native Hawaiians, including those on Molokaʻi, exhibit high rates of being overweight and obese with related high prevalence of diabetes, cardiovascular disease, and cancer.<sup>150, 151, 152</sup> Researchers have claimed that these rates can be attributed to Hawaiian “cultural norms.” Aluli (1991) challenges this assumption by citing the observations of early explorers such as Captain James Cook and Reverend William Ellis. Cook wrote the following description of the natives in his log: “The Natives of these islands are, in general, above the middle size (taller), and well made; they walk very gracefully, run nimbly, and are capable of bearing great fatigue.”<sup>153</sup>

A different explanation for the prevalence of obesity and related diseases among native Hawaiians is a shift in dietary habits. Aluli (1991) observes that, over the past few decades, there has been a significant change in the native Hawaiian diet, which now includes more processed and ready-made food with higher levels of saturated fats and cholesterol. In many areas, including Molokaʻi, the starchy taro as traditional staple food of the Hawaiians has been replaced by white polished rice and canned or packaged high-calorie food distributed through commercial food market chains. In comparison, the traditional Hawaiian diet was simpler, with fruits and vegetables as sources of complex carbohydrates and fish as the main source of protein. In an applied community trial, the traditional Hawaiian diet was found to contain lower health risk factors, with around 8 to 12 percent fat, 78 percent complex carbohydrates, and around 12 percent protein content.<sup>154</sup> Part of the study was conducted on Molokaʻi and a health practitioner who was involved explained that the program led to a better understanding of the importance of bringing back the traditional Hawaiian way of eating. He explained in his own words:

“From that program, we started to figure out, well, let’s go back to the culture and let’s figure out what they ate. Fish was a really important part of the diet. Fish and kalo were very important. As we know, for fish, there’s very little fat in them. It’s a good source of protein but little fat. So the...program look[ed] at the cultural effects of diet and create[d] a template to follow. Education portion first, and then the actual eating portion. So fish was heavily included in that. It is interesting because most of the pork that was eaten [before] was eaten more by royalty, the aliʻi. The commoners ate primarily fish, dog, and carbohydrates: ‘ulu [breadfruit], taro, sweet potato.”

Literature on Traditional Hawaiian Diet (THD) suggests that such programs may not only be effective for weight loss and improved health, but also create awareness among

the participants about the cultural and health values of a traditional diet. The most significant barriers to continue staying on the THD after the end of the program were identified as lack of social support and difficulty in accessing low-fat foods such as fish. The study authors further elaborated that health practitioners and advocates must work towards providing full access to the lands and seas for native Hawaiians to ensure both availability and affordability of a healthy diet.<sup>155</sup>

In 1994 Dr. Aluli stated in an interview:

“The people of Moloka‘i have stayed healthy because they have a subsistence lifestyle. Today part of our battle is to protect our resources and use them sustainably so the next generations will also have the benefit of living off the healthy foods of the land and ocean. I find it hard to separate healing and fighting for the land. If you’re ill then the whole family suffers, and if the family suffers, it extends into the community. It’s the same with the land. The land is alive—a source of strength, inspiration, and of healing. When the land suffers, we become ill.”<sup>156</sup>

Community consultations indicate that the majority of participants agree that eating fish leads to better health. A kupuna who continues to access Mo‘omomi frequently for food and lives off the land explained how his lifestyle dependence on fish has kept him healthy:

“I’m pushing 70, no heart disease, my blood pressure good and no cholesterol. I’m in top shape because I live off the land. I don’t eat canned goods. Every time I go to the doctor, I’m in perfect condition. So, what we eat, *limu kōhu* [type of seaweed], ‘opihi, *hā‘uke‘uke* [type of sea urchin], and fish, and deer meat. That’s all healthy food we eat. We eat sweet potato. So we live off the land. So I tell you, we live a lifestyle as poor people, but a lifestyle that we enjoy. Simple as that.”

Another prominent older fisherman also attributed his good health to his lifestyle, which enables him to stay active and still provide for his family. He explained:

“I’m one healthy individual...I still can run down the beach, run down the sand, catch my fish, feed my family, take care of my grandkids.” He spoke proudly of his health and said, “all my friends they tell me they get diabetes, they [have] all these kine [diseases]. All the guys [say to me], ‘You no mo’ diabetes?’” He understood the direct link between good nutrition, exercise, and good health. “If you eat good, you go to the doctor less. You no need go doctor that much,” he said.

One resident of Ho‘olehua shared that many of his friends have passed away from diet-related diseases. “I’ve seen my classmates die before me and a lot of reasons they were dying [were] because of diabetes, overweight, poor health. That was all attributed, in my mind, to food. Overeating. Eating too much fat, eating too much sugar...It’s the food. It’s the lifestyle that we’re all being taught that is how we’re supposed to live, to be part of our everyday life. We’re not as healthy compared to the stories and the history of our people.” He referred to the traditional Hawaiian diet and recalled different eating habits as a child. “We never had that growing up and now there’s all this processed food. You gotta be blind not to see the health [implications]...We’re talking about people who come from a history of being really healthy people. So it really bothers me.”

One interview participant feared that the youth have other activities and distractions that result in dietary changes for their families:

“I think we’re losing the kids. We get handful parents just like me who want to teach our kids, but a lot of kids are stuck in the computer thing. Not too many ‘eleu kids anymore who go fish and dive like that...we got some hunters and some divers and fishermen but not like how [when] I was a kid.”

He attributed the intergenerational difference to youth today not being exposed to the type of lifestyle he grew up with of fishing every day for food. He believed that the change in behavior is possibly because people are less dependent on the ocean since there are other alternative foods from which to choose, contrasting his upbringing which depended on fish for protein. He explained that while many people on Moloka‘i still depend on the ocean, he felt that “the younger ones are kinda losing touch...it seems like they’re losing touch because everything else is happening. Technology is moving into Moloka‘i and we’re not immune to it and kids want to be hip with the times.”

This suggests that unless a return to traditional marine management practices is associated with a return to traditional Hawaiian dietary practice, harvesting, and gathering activities, preserving the marine resource stock at Mo‘omomi through a CBSFA will not necessarily result in greater widespread household fish consumption as a source of nutrition that is healthier than other contemporary choices.

With the exception of a few participants who fish regularly and depend on fish for daily sustenance, the majority of interviewees explained that they consume less fish now compared to years gone by. Some of the reasons for changes in dietary patterns included the availability of other proteins to choose from, the inability to fish due to old age, time constraints, or being relocated to a homestead that is far away from their ahupua‘a and fishing ground of origin. Others referred to less fish in the ocean compared to before.

Although scoping didn't bring the relationship between access to Mo'omomi and healthy physical activity to the fore, several community participants mentioned it. The ability to practice traditional marine activities was recognized as having potential to support metabolic health, as it entails cardiovascular forms of exercise such as walking along the reef and carrying equipment. Physical inactivity is significantly associated with the prevalence of myocardial infarction (MI) and stroke among Hawaiians.<sup>157</sup> Physical activities associated with subsistence fishing likely play a vital role in maintaining a healthy lifestyle.

In community consultations residents agreed that fishing brings associated benefits such as exercise. As a former athlete, one interviewee stays in shape and prioritizes exercise through his fishing practices. He ran the Honolulu Marathon more than 30 times and he incorporates fishing at Mo'omomi as part of his conditioning to stay in shape. He explained:

"I played a lot of basketball and cross country so that's why I like diving because all those exercises enhance my diving. Lungs. Everything I do, I gotta bend down, pick up the 'opihi, get the crab. Everything is down there so that is the exercise for me. So I do plenty bending exercises. I strengthen my back because that's the one I use to carry a lot. I do a lot of walking. Everything I do, I walk. I get one pack, I can carry about...maybe about 130 pounds of food. Everything I need, I can stay out there for about 48 hours. But just being one athlete, that mentality is the same as fishing, picking 'opihi. You want to do all these things very efficiently because it's dangerous. Down here is just sand and rocks. So you gotta walk in that soft sand. Need strong legs cause you got a load on you, you going sink. And then you gotta walk on these rocks, about one or two miles. That's what I do and I love it. I love it. It's a great exercise for my feet, underneath my feet and if I get one headache, I go down to the beach, I can find the rocks and step on them, then everything [all the pain] go away."

Another resident who frequents Mo'omomi makes time to go fishing about three times a week to feed his family even though he has a busy schedule. As a farmer with a large farm to manage and little time for personal activities, fishing is a time when he can also exercise while being productive. He explained:

"Before, we'd go running, make time for exercise, but lately in my life because of time, I cannot see exercising for nothing...Make your time valuable, because for us our kuleana is big. The land is big. We like to work the land, so most of the time we would try to maximize our time on the 'āina. And whatever time we get, we like to use that time wisely. So most of

the time that's going *holoholo* [go out for a walk or sail, go out for pleasure]. I love being in the water surfing and paddling and doing all that kind of stuff. But for myself, I hardly get the time to do that.

"I'm glad my dad makes the time to do that because he really needs that. He craves it. He craves the work out in the ocean, increase that time. I do too, but I do it in a different way. I go get food...We 'ono fish, my family 'ono fish. So we like to eat fish. We can eat other food and we do. We eat other stuff like deer and sometimes we shop for our food. But for the most part, primarily it's myself. My father is another fish lover, my mom too. My whole family love fish, but they're not crazy over eating fish. Not like me or my father. We always got to eat fish."

He also described the type of exercise one gets when going fishing at Mo'omomi to be a different kind of exercise both physically and mentally. It is an especially good workout because there is fish to eat when one goes home. He describes the relationship between fishing and exercise in more detail:

"It's really different from conventional exercise. Sometimes I take my cousins or friends. They might work out, they might be in shape but then when they come with me, it's a different kind of workout...Work out your mind, work out your wits, work out all the little fingers and toes and everything like that. It's feeling your toes cling on the rocks. Walking the sand with a bag of fish, build up the calves. It's making sure you're exercising your mind, keeping your eye on the ocean and making sure you are in tune with everything because it's a matter of your life because the ocean is so rough. The land is rugged. The ground is real rugged down here...The water over here is if you're not careful, then it could be [your] life. Many people lose their life down here, making 'opihi or just not paying attention."

Like the preceding fisher, he described the experience of fishing as akin to therapy. "It's [a] therapy kind of thing, [being] in tune with yourself, in tune with the whole [of] nature and [your] surroundings."

### **Commercial Fish Sales and Fishers' Income**

The introduction of commercial fishing in Hawai'i saw a shift in the behavior and relationships that people had to their natural resources. This shift influenced the rise of contemporary fishing practices, individual accomplishment, and fishing policies made with considerable uncertainty about how fishermen would behave collectively. The introduction of new technologies, refrigeration, and more efficient fishing gear increased

the value of profit-based practices.<sup>158</sup> It became uncertain whether short-term catches would sustain Hawai‘i for future generations.<sup>159</sup>

Today, commercial fisheries have developed into a major cash-based economy in Hawai‘i, controlled by remote global market demand.<sup>160</sup> Commercial fishing supplies approximately one-third of Hawai‘i’s demand for seafood, with the balance imported from off-island U.S. and foreign sources. In addition to the direct economic impact of the wholesale and retail seafood industry, the ripple effects of commercial fishing spread throughout the economy in the form of wages and salaries, income and general excise taxes, sales of ancillary supplies and items, harbor infrastructure, vessel maintenance, and more.<sup>161</sup>

The following statistics are cited in HIPA’s report to the U.S. Department of Commerce on Hawai‘i’s fisheries industry based on 2006 data:

- The number of commercial fishing licenses issued was 3,137.
- The valued added from commercial fishing contributed approximately \$69.7 million to Hawai‘i’s annual economy.
- About 26 million pounds of wild catch valued at \$66.8 million (wholesale) were brought in by Hawai‘i’s fishing industry.
- The major purchasers of Hawai‘i’s seafood products are eating and drinking establishments, hotels, hospitals, and food stores.<sup>162</sup>

Hawai‘i’s top-producing fisheries—a term that refers both to species of fish or stock groups as well as methods of fishing—have, for a significant period, been the deep-set longline fishery for tuna and the shallow-set longline fishery for swordfish. In 2006 the tuna harvest was 14.8 million pounds, or 57 percent of the state’s total annual commercial landings. Longlining for swordfish declined from nearly 11 million pounds in the early 1990s—when Hawai‘i supplied approximately two-thirds of U.S. domestic landings for the species—to 2.6 million pounds in 2006, primarily due to lawsuits involving interactions with endangered sea turtles and resulting restrictions.<sup>163</sup> Other top commercial fisheries are trolling for tuna and other fish such as mahimahi and ono, pole-and-line (aku boat) for skipjack tuna (*aku*), handlining in the day or night for bigeye and yellowfin tuna, handlining for bottomfish and coral-reef fish, trap fishery for lobster and shrimp, and precious coral harvests via scuba or submersible. These commercial data, and data noted below, are only as reliable as the information submitted by commercial fishers and are likely underreported.

In addition to commercial fishing, data from the 2006 Hawai‘i Marine Recreational Fishing Survey on recreational fishing in Hawai‘i indicate that 396,413 recreational

fishers brought in 17.6 million pounds of fish. The U.S. Fish and Wildlife Service reports less than half the number of recreational fishers in the same year at 158,000, noting that 58 percent of these fishers are Hawai'i residents and 42 percent are out-of-state visitors. The discrepancy might be accounted for by survey methodology and accuracy, but also points to the lack of required state licensing for recreational fishers.<sup>164</sup> The absence of licensing and reporting requirements for recreational fishers who may sell part of their catch to offset expenses or who do not sell their catch confounds the reporting of commercial, recreational, and subsistence fishing in Hawai'i. For example, a 1996 survey of small boat fishers classified 41 percent as expense fishers (those who sell part of their catch to offset expenses), 28 percent as pure recreational/sustenance fishers (who do not sell their catch), and the remainder as full- or part-time commercial fishers.<sup>165</sup> A 2015 research study estimates that recreational, or non-commercial catch, is at least nine times the commercial catch in nearshore fisheries across the Hawaiian Islands, with a substantially higher percentage on Moloka'i.<sup>166</sup>

Researchers have established that the commercialization of fisheries has created a dramatic decline in Hawaiian fisheries stock and production, and there is public concern over the lack of effective enforcement of fishing and marine resource laws on the recreational and commercial fishers.<sup>167, 168, 169, 170</sup> Some commercial fishers, however, have contested the establishment of community-based subsistence fishing areas (CBSFAs) in Hawai'i, asserting that commercial fishermen are also trying to feed their families and are being deprived of part of their livelihood as a result of most recently established CBSFA restrictions on Kaua'i. In testimony against the proposed rules for the Hā'ena CBSFA, one O'ahu commercial fisherman stated, "We are losing our right to fish at a rapid rate. Yesterday's decisions to allow a community (Hā'ena) to create administrative rules without science or proper vetting through the community will have lasting negative impacts on our individual fishing practices and ocean access."<sup>171</sup> Fishing industry organizations such as the Western Pacific Regional Fishery Management Council may also have concerns about placing CBSFA restrictions on commercial fishing.

In Mo'omomi specifically (Area 312, from 'Īlio Point to Kahi'u Point), a total of 52 commercial fishing licensees reported catching a total of 51 different species from 2010 to 2014, of which 42 species were reported sold. The total catch reported during that five-year period was 63,366 pounds, of which 40.7 percent was reported sold for a value totaling \$105,861. In terms of yearly averages, 14 commercial fishers accessed the Mo'omomi area, catching 12,673 pounds of fish and selling 5,154 pounds for an annual value of \$21,172.<sup>172</sup>

Of the 52 licensees reporting data to the Hawai'i Division of Aquatic Resources (DAR), 37 were registered as residing on O'ahu, nine on Maui and six on Moloka'i. The six Moloka'i fishers who registered their catch during 2010–2015 reported a total five-year



commercial value of \$17,661, or an average of \$2,944 per year. The additional Maui fishers reported a total of \$4,371 value for the five years, an average of \$488 per year. The 37 O‘ahu licensees reported a total value of \$38,800 over five years, with an average of \$707 per licensee per year.<sup>173</sup>

While the proposed community proposed regulations for Mo‘omomi will limit the number of fish that can be caught in the nearshore area, the *akule* [big-eyed or goggle-eyed scad] fishery would still be in operation to accommodate fishers who depend on the sale of fish for income. Otherwise, proposed rules for Mo‘omomi indicate that no fish other than *akule* should be taken and sold for money. As Poepoe reiterates, rules that limit the methods that people use and the number of fish per person per day would create disincentives for fishermen to travel all the way from other islands, but the rules do not exclude them.

One resident who used to fish commercially for about 20 years explained that commercial fishermen would not really impact the CBSFA “because commercial fishermen go...offshore.” One Moloka‘i resident and paddling coach adds that when it comes to deep-sea fishing, “that’s a whole ‘nother realm”:

“It gets replenished from the currents from all over. Fish move in, move out [with] the current. But when you talk about reef fish, and you start hitting the reef fish, that’s when damage can happen. So the main concern is the reef fish, about 300–500 yards off the reef. That should be plenty room outside for them [commercial fishermen] to do any deep-sea or bottom fishing. But the reef, that’s what we wanna protect.”

Consultations indicate that the people of Moloka‘i generally don’t fish at Mo‘omomi to sell, and DAR data indicate that relatively few fishers report commercial catch from Mo‘omomi, most of which is likely to be caught beyond the nearshore CBSFA-proposed boundary. The policy would therefore most likely affect fishermen outside of Moloka‘i, and even that effect appears to be small. Commercial and nearshore subsistence fishers in large part target different species than commercial fishers; furthermore, the jurisdiction of the CBSFA is focused on a region that is not a primary area for commercial fishers. It appears that nearshore limitations would not significantly impact commercial fishing income at this time.

In fact, there is research to suggest maintaining healthy, sustainable reef ecosystems has a positive spillover effect that could ultimately benefit commercial fishers harvesting in deeper waters outside of CBSFA and other protected areas.<sup>174, 175, 176</sup>

## RECOMMENDATIONS

The assessment findings detailed above suggest the following recommendations:

1. **Support BLNR approval of CBSFA rules for Mo‘omomi, with a clear co-management strategy and resources for its implementation.**

Involvement in the development and implementation of CBSFA rules is likely to increase a sense of control, connection, and sovereignty over local resources that could have a positive effect on Native Hawaiian well-being for the population that accesses the Mo‘omomi fishery. Community consultations regarding Mo‘omomi indicate that the majority of people interviewed believe that allowing communities to devise management regulations would be good for the protection of marine resources and the perpetuation of a subsistence choice independent of global economic forces. Some community members, however, were opposed or were skeptical of the proposed Mo‘omomi rule-making process for reasons that included:

- Personal conflicts among community members who had different opinions as to how the rules should be formulated.
- Potential misunderstanding of CBSFA intent with the belief that rules will eliminate fishing altogether and prevent people from feeding their families.

Because the DLNR CBSFA process requires community outreach and at least one required public hearing, a corollary recommendation of this report is to continue community dialogue between the leaders and members of Hui Mālama O Mo‘omomi, the DAR administration, and other residents of Moloka‘i to promote maximum understanding of and support for proposed regulations.

This consensus-seeking process is time-consuming and is not necessarily a traditional Hawaiian method of rulemaking. It could be argued that not giving credence to the authority of a konohiki to make and enforce resource management regulations is a violation of Native Hawaiian legal rights (for a legal background, see Appendix B at [koha.la/moomomi-legal](http://koha.la/moomomi-legal)). Given HIA findings about the positive value of preserving and transmitting ancestral knowledge, time is of the essence for CBSFA approval. Indigenous knowledge is disappearing rapidly as kūpuna pass away. There is an urgent need to act so that key Native Hawaiian elders have the opportunity to implement traditional resource management strategies and train others to carry this expertise into the future. Once the knowledge is gone, it cannot be recovered, and an important pathway to restoring and maintaining community well-being could be lost.<sup>177, 178</sup>

Delaying the CBSFA approval process is not recommended; however, the interviews conducted for this assessment suggest that the most positive outcome for community cohesion, and by implication community well-being, will be reached through ongoing education about the potential benefits and regulatory details of the CBSFA.

**2. Continue and support the Mo‘omomi CBSFA as a place for the study and teaching of traditional Native Hawaiian fishery management practices.**

CBSFA designation and management have the ability to further engage Ho‘olehua and Moloka‘i residents in traditional Native Hawaiian cultural practices and to provide a focal point for the intergenerational transmission of ancestral cultural knowledge, thereby supporting Native Hawaiian well-being through strengthened connections to cultural identity, place, and community. A recommendation that stems from HIA interviews and educational research literature is to continue Hui Mālama O Mo‘omomi’s efforts to establish the Mo‘omomi CBSFA as a place for the study and teaching of traditional Native Hawaiian fishery management practices, with recognition and assistance from Hawai‘i’s educational institutions, and with the human and financial resources to encourage the perpetuation of cultural knowledge and traditional practices, along with the teaching and use of contemporary scientific methods that can assist in documenting the long-term results of those practices.

One fisherman who frequents Mo‘omomi expressed his thoughts about designating Mo‘omomi as a CBSFA:

“It’s a golden opportunity for our kids, for our community. I see it as enhancing our access to education and...enhancing our access to food—to good food! I believe that there’s more access...There’s more educational opportunities for [the] younger generation—where you can study what you have in your backyard. You can inventory. You can look at what you have and then you can look at the best ways to manage...Then also they can be offered opportunities for...college, internships, whatever, through something like this because they get a classroom right in their backyard. It’s also an opportunity not just for Moloka‘i kids, but for kids all over the state and all over the world for that matter to come here and to look at one managed area...where people are still taking [care]. It’s easy [to] just close off one place and just say, ‘Hey, hands off everybody!’ But that’s not a smart thing to do. That’s a lazy thing to do. But if you can manage your area, that’s the challenge.”

### 3. Emphasize the value of traditional Hawaiian foods in a subsistence-based diet.

Dietary research in the Hawaiian community has confirmed that returning to a diet based on fish protein and traditional Polynesian starches such as kalo and 'uala reduces metabolic disease indicators and likely leads to greater physical health. Those on Moloka'i who are advocating for a Mo'omomi CBSFA, along with research in Hā'ena on the Island of Kaua'i, suggest that assuring access to the fishery for subsistence purposes will result in the relatively wide distribution of gathered marine resources to local families. Community interviews on Moloka'i, however, indicated that many people are eating less fish than they did in the past. One of the primary reasons cited is that there are other choices available, considering the abundance of low-cost, high-fat sources of protein in local grocery stores and fast-food establishments. Given the stated pride that Moloka'i residents have in the extent of their subsistence economy and their desire to be more food self-sufficient, as emphasized in numerous community reports and visioning sessions, there may be an opportunity to use the cultural relationship and control of a resource like Mo'omomi to publicize and encourage a return to a more traditional Hawaiian diet.

## CONCLUSION

The findings from this Health Impact Assessment support BLNR approval of CBSFA regulations for Mo'omomi, with a clear co-management strategy and resources for its implementation. Both secondary sources and community interviews suggest that the CBSFA has the clear potential to enhance individual, family, and community well-being by (1) supporting self-determination and self-governance of marine resources, guided by Native Hawaiian tradition with a history of sustaining the health of those resources; (2) strengthening social connections enabled by traditional subsistence practices and the transmission of those practices and their associated values to younger generations; and (3) improving community food security and assuring the availability of a high-quality source of food over time. Findings also suggest that the CBSFA limitations will not substantially affect income generated from commercial fishing, and may have a positive effect on fish stocks in areas outside of the CBSFA.

## ENDNOTES

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<sup>1</sup> Matsuoka, J, D McGregor, L Minerbi, and M Akutagawa. 1994. Governor's Moloka'i Subsistence Task Force final report. Honolulu: [The Task Force].

<sup>2</sup> *Haw. Rev. Stat. §188-22.6*. 1994.

<sup>3</sup> *Haw. Rev. Stat. §188-22.6*. 1994.

<sup>4</sup> Higuchi, Jodi. 2008. "Propagating Cultural Kīpuka: The Obstacles and Opportunities of Establishing a Community-Based Subsistence Finishing Area." *University of Hawai'i Law Review* 31:193.

<sup>5</sup> Higuchi, Jodi. 2008. "Propagating Cultural Kīpuka: The Obstacles and Opportunities of Establishing a Community-Based Subsistence Finishing Area." *University of Hawai'i Law Review* 31:193.

<sup>6</sup> Sakoda, David. 2014, September 10. "CBSFA Rulemaking, Presentation to the Native Hawaiian Rights Clinic." Univ. of Haw. William S. Richardson Sch. of Law

<sup>7</sup> Sakoda, David. 2014, September 10. "CBSFA Rulemaking, Presentation to the Native Hawaiian Rights Clinic." Univ. of Haw. William S. Richardson Sch. of Law

<sup>8</sup> The Pew Charitable Trusts. "Health Impact Assessment."  
<http://www.pewtrusts.org/en/projects/health-impact-project/health-impact-assessment>.

<sup>9</sup> Zandre, Erin. 2014. Community-based Subsistence Fishing Area Designation Procedures Guide. Division of Aquatic Resources, Hawai'i Department of Land and Natural Resources.

<sup>10</sup> Kittinger, John N., Adam Ayers, and Erin E. Prahler. 2012. Policy Briefing. Co-Management of Coastal Fisheries in Hawai'i: Overview and Prospects for Implementation. Rochester, NY: Stanford University, Center for Ocean Solutions and Department of Urban and Regional Planning, University of Hawai'i at Manoa, Monterey, CA and Honolulu, HI.

<sup>11</sup> Gonschor, L, and K Beamer. 2014. "Toward an Inventory of Ahupua'a in the Hawaiian Kingdom: A survey of Nineteenth- and early Twentieth-Century Cartographic and Archival Records of the Island of Hawai'i." *Hawaiian Journal of History* 48:53-87.

<sup>12</sup> Gupta, Clare. 2014. "Return to Freedom: Anti-GMO Aloha 'Āina Activism on Moloka'i as an Expression of Place-based Food Sovereignty." *Globalizations* 12:1-16. doi: 10.1080/14747731.2014.957586.

<sup>13</sup> Han, L, E Noordhoek, H Williams, and M Akutagawa. 2012. Agricultural Needs Assessment. In *Sustainable Moloka'i*.

<sup>14</sup> Hawaiian Homes Commission Act, 1920, Pub L. No. 67-34, 42 Stat. 108 (1921) (formerly codified as amended at 42 U.S.C. §§691-718 (1958) (omitted from codification in 1959) (set out in full as amended at 1 HAW. REV. STAT. 261 (2009)).

<sup>15</sup> McGregor, Davianna. 2007. *Nā Kua'āina: Living Hawaiian Culture*: University of Hawai'i Press.

- 
- <sup>16</sup> McGregor, Davianna. 2007. *Nā Kua‘āina: Living Hawaiian Culture*: University of Hawai‘i Press.
- <sup>17</sup> Matsuoka, J, D McGregor, L Minerbi, and M Akutagawa. 1994. Governor's Moloka‘i Subsistence Task Force final report. Honolulu: [The Task Force].
- <sup>18</sup> McGregor, Davianna. 2007. *Nā Kua‘āina: Living Hawaiian Culture*: University of Hawai‘i Press.
- <sup>19</sup> Moloka‘i Enterprise Committee. 1998. Moloka‘i Rural Empowerment Zone Application Submitted to the United States Department of Agriculture.
- <sup>20</sup> Moloka‘i Community. 2008. “Moloka‘i: Future of a Hawaiian Island.” *Hūlili: Multidisciplinary Research on Hawaiian Well-Being* 5:13-63.
- <sup>21</sup> McGregor, Davianna. 2007. *Nā Kua‘āina: Living Hawaiian Culture*: University of Hawai‘i Press.
- <sup>22</sup> Busch, J, R Cortez, and C Srivastava. 2012. Moloka‘i Material Flow Analysis. Yale University.
- <sup>23</sup> Han, L, E Noordhoek, H Williams, and M Akutagawa. 2012. Agricultural Needs Assessment. In *Sust‘ainable Moloka‘i*.
- <sup>24</sup> Hawaiian Homes Commission Act, 1920, Pub L. No. 67-34, 42 Stat. 108 (1921) (formerly codified as amended at 42 U.S.C. §§691-718 (1958) (omitted from codification in 1959) (set out in full as amended at 1 HAW. REV. STAT. 261 (2009)).
- <sup>25</sup> Hui Mālama O Mo‘omomi. 1995. Proposal to Designate Mo‘omomi Community-based Subsistence Fishing Area.
- <sup>26</sup> Summers, Catherine C. 1971. *Moloka‘i: A Site Survey*. Department of Anthropology, Bernice Pauahi Bishop Museum.
- <sup>27</sup> The Nature Conservancy of Hawai‘i. 2011. Mo‘omomi Preserve Moloka‘i, Hawai‘i: DRAFT Long-Range Management Plan Fiscal Years 2013–2018.
- <sup>28</sup> U.S. Census Bureau. 2012. Statistical Abstract of the United States.
- <sup>29</sup> U.S. Census Bureau. 2014. 2009–2013 ACS 5 Year Summary Files and Data Profiles. In *The American Community Survey (ACS)*.
- <sup>30</sup> Hawai‘i State Department of Health. 2010. Hawai‘i Health Survey.
- <sup>31</sup> Look, Mele A., Gregory G. Maskarinec, Mapuana de Silva, Todd Seto, Marjorie L. Mau, and Joseph Keawe‘aimoku Kaholokula. 2014. “Kumu hula perspectives on health.” *Hawai‘i Journal of Medicine & Public Health: A Journal of Asia Pacific Medicine & Public Health* 73:21-25.
- <sup>32</sup> Aluli, Noa Emmett, Phillip W. Reyes, and JoAnn ‘Umilani Tsark. 2007. “Cardiovascular Disease Disparities in Native Hawaiians.” *Journal of the CardioMetabolic Syndrome* 2:250-253. doi: 10.1111/j.1559-4564.2007.07560.x.
- <sup>33</sup> Aluli, N. Emmett, Phillip W. Reyes, S. Kalani Brady, JoAnn U. Tsark, Kristina L. Jones, Marjorie Mau, Wm. J. Howard, and Barbara V. Howard. 2010. “All-cause and CVD mortality in Native Hawaiians.” *Diabetes Research and Clinical Practice* 89:65-71. doi: 10.1016/j.diabres.2010.03.003.

- 
- <sup>34</sup> Moloka‘i Community. 2008. “Moloka‘i: Future of a Hawaiian Island.” *Hūlili: Multidisciplinary Research on Hawaiian Well-Being* 5:13-63.
- <sup>35</sup> Han, L, E Noordhoek, H Williams, and M Akutagawa. 2012. Agricultural Needs Assessment. In *Sust‘ainable Moloka‘i*.
- <sup>36</sup> Belforte, J, J Carter, F Reinisch, and D Zheng. 2013. Hawai‘i County Community Health Needs Assessment. Healthcare Association of Hawai‘i (HAH).
- <sup>37</sup> Panapasa, Sela V., Marjorie K. Mau, David R. Williams, and James W. McNally. 2010. “Mortality patterns of Native Hawaiians across their lifespan: 1990-2000.” *American Journal of Public Health* 100:2304-2310. doi: 10.2105/AJPH.2009.183541.
- <sup>38</sup> Ka‘opua, Lana Sue, Kathryn L. Braun, Colette V. Browne, Noreen Mokuau, and Chai-Bin Park. 2011. “Why Are Native Hawaiians Underrepresented in Hawai‘i’s Older Adult Population? Exploring Social and Behavioral Factors of Longevity.” *Journal of Aging Research* 2011:701232. doi: 10.4061/2011/701232.
- <sup>39</sup> Look, Mele A., Gregory G. Maskarinec, Mapuana de Silva, Todd Seto, Marjorie L. Mau, and Joseph Keawe‘aimoku Kaholokula. 2014. “Kumu hula perspectives on health.” *Hawai‘i Journal of Medicine & Public Health: A Journal of Asia Pacific Medicine & Public Health* 73:21-25.
- <sup>40</sup> Aluli, Noa Emmett, Phillip W. Reyes, and JoAnn ‘Umilani Tsark. 2007. “Cardiovascular Disease Disparities in Native Hawaiians.” *Journal of the CardioMetabolic Syndrome* 2:250-253. doi: 10.1111/j.1559-4564.2007.07560.x.
- <sup>41</sup> Aluli, N. Emmett, Phillip W. Reyes, S. Kalani Brady, JoAnn U. Tsark, Kristina L. Jones, Marjorie Mau, Wm. J. Howard, and Barbara V. Howard. 2010. “All-cause and CVD mortality in Native Hawaiians.” *Diabetes Research and Clinical Practice* 89:65-71. doi: 10.1016/j.diabres.2010.03.003.
- <sup>42</sup> Hawai‘i State Department of Health. 2011. Hawai‘i Health Survey.
- <sup>43</sup> Naya, S. 2007. Income Distribution and Poverty Alleviation for the Native Hawaiian Community. Honolulu: East-West Center.
- <sup>44</sup> Bureau, US Census. 2014. 2009-2013 ACS 5 Year Summary Files and Data Profiles. In *The American Community Survey (ACS)*.
- <sup>45</sup> Belforte, J, J Carter, F Reinisch, and D Zheng. 2013. Hawai‘i County Community Health Needs Assessment. Healthcare Association of Hawai‘i (HAH).
- <sup>46</sup> Marsella, A. J., J. M. Oliveira, C. M. Plummer, and K. M. Crabbe. 1995. “Native Hawaiian culture, mind and well-being.” In *Resiliency in ethnic minority families*, edited by H. I. McCubbin, E. A. Thompson, A. I. Thompson and J. E. Fromer, 93-113. Madison: University of Wisconsin, Center for Excellence in Family Studies.
- <sup>47</sup> Kaholokula, J. K. 2007. “Colonialism, Acculturation, and Depression among Kānaka Maoli of Hawai‘i.” In *Penina Uliuli: Confronting Challenges in Mental Health for Pacific Peoples*, edited by P. Culbertson, M. N. Agee and C. Makasiale, 180-195. Honolulu, HI: University of Hawai‘i Press.

- 
- <sup>48</sup> Look, Mele A., Joseph Keawe Kaholokula, Amy Carvalho, Todd Seto, and Mapuana de Silva. 2012. "Developing a culturally based cardiac rehabilitation program: the HELA study." *Progress in Community Health Partnerships: Research, Education, and Action* 6:103-110. doi: 10.1353/cpr.2012.0012.
- <sup>49</sup> Liu, David M. K. I., and Christian K. Alameda. 2011. "Social determinants of health for Native Hawaiian children and adolescents." *Hawai'i Medical Journal* 70:9-14.
- <sup>50</sup> Fa'anunu, Angela. 2015. "Bringing back Ho'okipa: Engaging Tourism for Sustainable Self-Determination in the Pacific." University of Hawai'i.
- <sup>51</sup> Salzman, Michael B. 2001. "Cultural Trauma and Recovery Perspectives from Terror Management Theory." *Trauma, Violence, & Abuse* 2:172-191. doi: 10.1177/1524838001002002005.
- <sup>52</sup> Kamakau, Samuel Manaiakalani. 1992. *Ruling Chiefs of Hawai'i*: Kamehameha Schools Press.
- <sup>53</sup> Kame'eleihiwa, Lilikalā. 1992. *Native Land and Foreign Desires*: Bishop Museum Press.
- <sup>54</sup> Kauanui, J. K. 1998. "Off-island Hawaiians "making" ourselves at "home": A [gendered] contradiction in terms?" *Women's Studies International Forum* 21:681-693.
- <sup>55</sup> Malo, Davida. 1951. *Hawaiian antiquities (Moolelo Hawai'i)*: The Museum.
- <sup>56</sup> Osorio, Jonathan Kamakawiwo'ole. 2001. "'What Kine Hawaiian Are You?' A Mo'olelo about Nationhood, Race, History, and the Contemporary Sovereignty Movement in Hawai'i." *Special issue, The Contemporary Pacific* 13 (2):359-79.
- <sup>57</sup> Trask, Haunani-Kay. 1999. *From a Native Daughter: Colonialism and Sovereignty in Hawai'i*: University of Hawai'i Press.
- <sup>58</sup> Heart, Myhb, and L. M. DeBruyn. 1998. "The American Indian holocaust: Healing historical unresolved grief." *American Indian and Alaska Native Mental Health Research* 8:56-78.
- <sup>59</sup> Corn tassel, Jeff. 2008. "Toward Sustainable Self-Determination: Rethinking the Contemporary Indigenous-Rights Discourse." *Alternatives: Global, Local, Political* 33:105-132. doi: 10.1177/030437540803300106.
- <sup>60</sup> Goodyear-Ka'opua, Noelani. 2009. "Rebuilding the 'auwai: Connecting ecology, economy and education in Hawaiian schools." *AlterNative: An International Journal of Indigenous Peoples* 5:46.
- <sup>61</sup> Aikau, Hokulani K. 2012. *A Chosen People, a Promised Land: Mormonism and Race in Hawai'i*: U of Minnesota Press.
- <sup>62</sup> Corn tassel, Jeff. 2008. "Toward Sustainable Self-Determination: Rethinking the Contemporary Indigenous-Rights Discourse." *Alternatives: Global, Local, Political* 33:105-132. doi: 10.1177/030437540803300106.
- <sup>63</sup> Goodyear-Ka'opua, Noelani, Ikaika Hussey, and Erin Kahunawaika'ala Kahunawaika'ala Wright. 2014. *A Nation Rising: Hawaiian Movements for Life, Land, and Sovereignty*: Duke University Press.
- <sup>64</sup> McGregor, Davianna. 2007. *Nā Kua'āina: Living Hawaiian Culture*: University of Hawai'i Press.



- 
- <sup>65</sup> Mele.com. 2012. "Halau Hula (Hula Schools)." <http://www.mele.com/resources/hula.html>
- <sup>66</sup> Borofsky, A. R. H. 2010. "Measuring Native Hawaiian Leadership Among Graduates of Native Hawaiian Charter Schools." *Hūlili: Multidisciplinary Research on Hawaiian Well-Being* 6:169-185.
- <sup>67</sup> hokulea.com. "Hōkūle'a: Polynesian Voyaging Society." <http://www.hokulea.com/>.
- <sup>68</sup> NaKalaiWaa.org. "Na Kalai Waa: Makali'i Voyaging Family." <http://www.nakalaiwaa.org/>.
- <sup>69</sup> McGregor, Davianna Pomaika'i, Paula T. Morelli, Jon K. Matsuoka, Rona Rodenhurst, Noella Kong, and Michael S. Spencer. 2003. "An ecological model of Native Hawaiian well-being." *Pacific Health Dialog* 10:106-128.
- <sup>70</sup> McGregor, Davianna Pomaika'i, Paula T. Morelli, Jon K. Matsuoka, Rona Rodenhurst, Noella Kong, and Michael S. Spencer. 2003. "An ecological model of Native Hawaiian well-being." *Pacific Health Dialog* 10:106-128.
- <sup>71</sup> Davidson-Hunt, I. J., and F Berkes. 2001. "Changing resource management paradigms, traditional ecological knowledge, and non-timber forest products." proceedings of the meeting; 1999 October 1-4; Kenora, Ontario, Canada. Gen. Tech. Rep. NC-217, St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Research Station, 2001.
- <sup>72</sup> Kanahale, George S. 1986. *Kū kanaka, stand tall : a search for Hawaiian values, A Kolowalu book*. Honolulu: University of Hawai'i Press : Waiaha Foundation.
- <sup>73</sup> Rezentes, W. C. III. 1996. *Ka lama kukui Hawaiian psychology: An introduction*. Honolulu, HI: 'A'ali'i Books.
- <sup>74</sup> Casken, John. 2001. "Improved Health Status for Native Hawaiians: Not Just What the Doctor Ordered." *Wicazo Sa Review: A Journal of Native American Studies* 16:75-89. doi: 10.1353/wic.2001.0003.
- <sup>75</sup> Handy, E. S., E. G. Handy, and Mary Kawena Pukui. 1972. *Native Planters in Old Hawai'i: Their Life, Lore, and Environment*. Bishop Museum Press.
- <sup>76</sup> Ito, Karen L. 1985. "Ho'oponopono, "to make right": Hawaiian conflict resolution and metaphor in the construction of a family therapy." *Culture, Medicine and Psychiatry* 9:201-217. doi: 10.1007/BF00117369.
- <sup>77</sup> Judd, N. L. K. M. 1998. "Laau Lapaau: herbal healing among contemporary Hawaiian healers." *Pacific Health Dialog* 5:239-245.
- <sup>78</sup> Marsella, A. J., J. M. Oliveira, C. M. Plummer, and K. M. Crabbe. 1995. "Native Hawaiian culture, mind and well-being." In *Resiliency in ethnic minority families*, edited by H. I. McCubbin, E. A. Thompson, A. I. Thompson and J. E. Fromer, 93-113. Madison: University of Wisconsin, Center for Excellence in Family Studies.
- <sup>79</sup> McGregor, Davianna Pomaika'i, Paula T. Morelli, Jon K. Matsuoka, Rona Rodenhurst, Noella Kong, and Michael S. Spencer. 2003. "An ecological model of Native Hawaiian well-being." *Pacific Health Dialog* 10:106-128.

- 
- <sup>80</sup> Mersberg, S. 2011. "Kalamakua: A Vision for Public Health Through a Native Hawaiian Perspective." Last Modified October 8, 2011. [http://cchc-conference.com/yahoo\\_site\\_admin/assets/docs/S\\_Mersberg\\_-\\_Kalamakua\\_-\\_pdf.318100021.pdf](http://cchc-conference.com/yahoo_site_admin/assets/docs/S_Mersberg_-_Kalamakua_-_pdf.318100021.pdf).
- <sup>81</sup> Ili, Sarah. 2000. The Importance of Subsistence and the Need for a Community-Based Subsistence Management at Mo'omomi Bay, Moloka'i, Hawai'i. In *Research Paper for the fulfillment of a Master's in Arts Degree* Pacific Islands Studies Department.
- <sup>82</sup> Kanahale, George S. 1986. *Kū kanaka, stand tall : a search for Hawaiian values, A Kolowalu book*. Honolulu: University of Hawai'i Press : Waiaha Foundation.
- <sup>83</sup> McGregor, Davianna Pomaika'i, Paula T. Morelli, Jon K. Matsuoka, Rona Rodenhurst, Noella Kong, and Michael S. Spencer. 2003. "An ecological model of Native Hawaiian well-being." *Pacific Health Dialog* 10:106-128.
- <sup>84</sup> Mau, E Ola. 1985. The Native Hawaiian Health Needs Study. In *Historical Cultural Task Force Report*.
- <sup>85</sup> Takeuchi, D, N Higginbotham, A Marsella, K Gomes, L Kwan, and B Ostrowski. 1987. "Native Hawaiian mental health." In *Contemporary issues in mental health research in the Pacific Islands*, edited by A. B. Robillard and A. J. Marsella. Honolulu, HI: University of Hawai'i Press.
- <sup>86</sup> Sioui, G. E. 1992. *For an Amerindian autohistory: an essay on the foundations of a social ethic*. Montreal: McGill-Queen's Press.
- <sup>87</sup> Kirmayer, Laurence J., and Gail Guthrie Valaskakis. 2009. *Healing traditions: the mental health of Aboriginal peoples in Canada*. Vancouver: UBC Press.
- <sup>88</sup> Harter, Susan. 1978. "Effectance Motivation Reconsidered Toward a Developmental Model." *Human Development* 21:34-64. doi: 10.1159/000271574.
- <sup>89</sup> White, Robert Winthrop. 1963. *Ego and reality in psychoanalytic theory: a proposal regarding independent ego energies*. International Universities Press.
- <sup>90</sup> Baumeister, R. F., and M. R. Leary. 1995. "The need to belong: desire for interpersonal attachments as a fundamental human motivation." *Psychological Bulletin* 117:497-529.
- <sup>91</sup> Reis, Harry T. 1994. "Domains of experience: Investigating relationship processes from three perspectives." In *Theoretical frameworks for personal relationships*, edited by R. Erber and R. Gilmour, 87-110. Hillsdale, NJ, England: Lawrence Erlbaum Associates, Inc.
- <sup>92</sup> DeCharms, Richard. 1968. *Personal causation: the internal affective determinants of behavior*. Academic Press.
- <sup>93</sup> Deci, Edward L. 1975. *Intrinsic Motivation*: Plenum Publishing Company Limited.
- <sup>94</sup> Merriam-Webster.com. "Definition of AUTONOMY." <http://www.merriam-webster.com/dictionary/autonomy>.

- 
- <sup>95</sup> Maly, K, and O Maly. 2003. KA HANA LAWAIA A ME NĀ KO‘A O NA KAI ‘EWALU: A history of fishing practices and marine fisheries of the Hawaiian Islands. Honolulu: The Nature Conservancy.
- <sup>96</sup> Anand, S. S., S. Yusuf, R. Jacobs, A. D. Davis, Q. Yi, H. Gerstein, P. A. Montague, and E. Lonn. 2001. “Risk factors, atherosclerosis, and cardiovascular disease among Aboriginal people in Canada: the Study of Health Assessment and Risk Evaluation in Aboriginal Peoples (SHARE-AP).” *Lancet (London, England)* 358:1147-1153.
- <sup>97</sup> Serna, A. K. 2006. “The Application of Terror Management Theory to Native Hawaiian Well-Being.” *Hūlili: Multidisciplinary Research on Hawaiian Well-Being* 3:127-149.
- <sup>98</sup> Manu, Moke, and Others. 2006. *Hawaiian Fishing Traditions*. Revised edition ed. Honolulu: Kalamakū Press.
- <sup>99</sup> Poepoe, Kelson K., Paul K. Bartram, and Alan M. Friedlander. 2003. “The use of traditional Hawaiian knowledge in the contemporary management of marine resources.” *Fisheries Center Research Reports* 11:328339.
- <sup>100</sup> Jokiel, P. L., K. S. Rodgers, W. J. Walsh, D. A. Polhemus, and T. A. Wilhelm. 2011. “Marine Resource Management in the Hawaiian Archipelago: The Traditional Hawaiian System in Relation to the Western Approach.” *Journal of Marine Biology* 2011:1-16. doi: 10.1155/2011/151682.
- <sup>101</sup> Vaughan, Mehana Blaich, and Peter M. Vitousek. 2013. “Mahele: Sustaining Communities through Small-Scale Inshore Fishery Catch and Sharing Networks.” *Pacific Science* 67:329-344. doi: 10.2984/67.3.3.
- <sup>102</sup> McGregor, Davianna Pōmaika‘i, and B La Benz. 2006. Cultural Assessment for the Mo‘omomi Preserve, Kaluako‘i, Island of Moloka‘i for The Nature Conservancy Moloka‘i Program, 32-34, 64-77, 80-82.
- <sup>103</sup> McGregor, Davianna Pōmaika‘i, and B La Benz. 2006. Cultural Assessment for the Mo‘omomi Preserve, Kaluako‘i, Island of Moloka‘i for The Nature Conservancy Moloka‘i Program, 32-34, 64-77, 80-82.
- <sup>104</sup> McGregor, Davianna. 2007. *Nā Kua‘āina: Living Hawaiian Culture*: University of Hawai‘i Press, 270.
- <sup>105</sup> Serna, A. K. 2006. “The Application of Terror Management Theory to Native Hawaiian Well-Being.” *Hūlili: Multidisciplinary Research on Hawaiian Well-Being* 3:127-149.
- <sup>106</sup> Stern, I. R., S Yuen, and M Hartsock. 2004. “A Macro Portrait of Hawaiian Families.” *Hūlili: Multidisciplinary Research on Hawaiian Well-Being* 1:73-92.
- <sup>107</sup> Kana‘iaupuni, S.M., and N Malone. 2006. “This Land is My Land: The Role of Place in Native Hawaiian Identity.” *Hūlili: Multidisciplinary Research on Hawaiian Well-Being* 3:281-307.
- <sup>108</sup> Vaughan, Mehana Blaich, and Peter M. Vitousek. 2013. “Mahele: Sustaining Communities through Small-Scale Inshore Fishery Catch and Sharing Networks.” *Pacific Science* 67:329-344. doi: 10.2984/67.3.3.

- 
- <sup>109</sup> Vaughan, Mehana Blaich, and Peter M. Vitousek. 2013. "Mahele: Sustaining Communities through Small-Scale Inshore Fishery Catch and Sharing Networks." *Pacific Science* 67:329-344. doi: 10.2984/67.3.3.
- <sup>110</sup> Vaughan, Mehana Blaich, and Peter M. Vitousek. 2013. "Mahele: Sustaining Communities through Small-Scale Inshore Fishery Catch and Sharing Networks." *Pacific Science* 67:329-344. doi: 10.2984/67.3.3.
- <sup>111</sup> Higuchi, Jodi. 2008. "Propagating Cultural Kipuka: The Obstacles and Opportunities of Establishing a Community-Based Subsistence Finishing Area." *University of Hawai'i Law Review* 31:193.
- <sup>112</sup> Vaughan, Mehana Blaich, and Peter M. Vitousek. 2013. "Mahele: Sustaining Communities through Small-Scale Inshore Fishery Catch and Sharing Networks." *Pacific Science* 67:329-344. doi: 10.2984/67.3.3.
- <sup>113</sup> Kana'iaupuni, Shawn, Brandon Ledward, and 'Umi Jensen. 2010. Culture-Based Education and Its Relationship to Student Outcomes. Honolulu: Kamehameha Schools, Research & Evaluation.
- <sup>114</sup> Pukui, M. K. 1983. *'Olelo No'eau: Hawaiian Proverbs & Poetical Sayings*. Honolulu: Bishop Museum Press, p:247-248
- <sup>115</sup> Erikson, Erik Homburger. 1963. *Childhood and Society*: Norton.
- <sup>116</sup> Hannah, Mo Therese, George Domino, A. J. Figueredo, and Rick Hendrickson. 1996. "The Prediction of Ego Integrity in Older Persons." *Educational and Psychological Measurement* 56:930-950. doi: 10.1177/0013164496056006002.
- <sup>117</sup> James, Jacquelyn Boone, and Nicole Zarrett. 2006. "Ego Integrity in the Lives of Older Women." *Journal of Adult Development* 13:61-75. doi: 10.1007/s10804-006-9003-2.
- <sup>118</sup> Cheng, Sheung-Tak. 2009. "Generativity in Later Life: Perceived Respect From Younger Generations as a Determinant of Goal Disengagement and Psychological Well-being." *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences* 64B:45-54. doi: 10.1093/geronb/gbn027.
- <sup>119</sup> Ross, Gandharva Mahina Hou. 2011. "E Ke Hoa Aloha 'Āina: Strategies for Teaching Hawaiian Culture Based, Place Based Scientific Inquiry: A paper presented at the National Association for Research " Science Teaching Annual International Conference.
- <sup>120</sup> King, T. L, R Ward, I. R Blandon, R. L Colura, and J. R Gold. 1995. "Using genetics in the design of red drum and spotted sea trout programs in Texas: A review." *American Fisheries Society Symposium* 15:499-502.
- <sup>121</sup> Friedlander, A. M., and E. E. DeMartini. 2002. "Contrasts in density, size, and biomass of reef fishes between the northwestern and the main Hawaiian Islands: the effects of fishing down apex predators." *Marine Ecology-progress Series* 230:253-264. doi: 10.3354/meps230253.

- 
- <sup>122</sup> Aswani, Shankar, and Richard Hamilton. 2004. "The value of many small v. few large marine protected areas in the Western Solomon Islands." *Traditional marine resource management and knowledge information bulletin* (16):3–14.
- <sup>123</sup> King, T. L, R Ward, I. R Blandon, R. L Colura, and J. R Gold. 1995. "Using genetics in the design of red drum and spotted sea trout programs in Texas: A review." *American Fisheries Society Symposium* 15:499–502.
- <sup>124</sup> Clarke, William C. 1990. "Learning from the Past: Traditional Knowledge and Sustainable Development." *The Contemporary Pacific* 2 (2):233–53.
- <sup>125</sup> Johannes, R. E. 2002. "The Renaissance of Community-Based Marine Resource Management in Oceania." *Annual Review of Ecology and Systematics* 33:317–340. doi: 10.1146/annurev.ecolsys.33.010802.150524.
- <sup>126</sup> Rapaport, Moshe. 2006. "Eden in peril: impact of humans on Pacific island ecosystems." *Island Studies Journal* 1:109–124.
- <sup>127</sup> King, T. L, R Ward, I. R Blandon, R. L Colura, and J. R Gold. 1995. "Using genetics in the design of red drum and spotted sea trout programs in Texas: A review." *American Fisheries Society Symposium* 15:499–502.
- <sup>128</sup> Russ, G. R., and A. C. Alcala. 1999. "Management histories of Sumilon and Apo Marine Reserves, Philippines, and their influence on national marine resource policy." *Coral Reefs* 18:307–319. doi: 10.1007/s003380050203.
- <sup>129</sup> White, Alan T, and Helge P Vogt. 2000. "Philippine Coral Reefs Under Threat: Lessons Learned After 25 Years of Community-Based Reef Conservation." *Marine Pollution Bulletin* 40:537–550. doi: 10.1016/S0025-326X(99)00243-X.
- <sup>130</sup> King, T. L, R Ward, I. R Blandon, R. L Colura, and J. R Gold. 1995. "Using genetics in the design of red drum and spotted sea trout programs in Texas: A review." *American Fisheries Society Symposium* 15:499–502.
- <sup>131</sup> Dahl, Christopher. 1997. "Integrated coastal resources management and community participation in a small island setting." *Ocean & Coastal Management* 36:23–45. doi: 10.1016/S0964-5691(97)00018-5.
- <sup>132</sup> Gilman, Eric L. 1997. "Community based and multiple purpose protected areas: A model to select and manage protected areas with lessons from the Pacific Islands." *Coastal Management* 25:59–91.
- <sup>133</sup> Ruddle, Kenneth. 1998. "The context of policy design for existing community-based fisheries management systems in the Pacific Islands." *Ocean & Coastal Management* 40:105–126. doi: 10.1016/S0964-5691(98)00040-4.
- <sup>134</sup> Aswani, Shankar, and Richard Hamilton. 2004. "The value of many small v. few large marine protected areas in the Western Solomon Islands." *Traditional marine resource management and knowledge information bulletin* (16):3–14.

- 
- <sup>135</sup> Friedlander, A., K. Poepoe, K. Poepoe, K. Helm, P. Bartram, J. Maragos, and I. Abbott. 2002. "Application of Hawaiian traditions to community-based fishery management." Proceedings of the Ninth International Coral Reef Symposium, Vol. 2, Jakarta, Ministry of Environment, pp. 813-18.
- <sup>136</sup> Friedlander, A., K. Poepoe, K. Poepoe, K. Helm, P. Bartram, J. Maragos, and I. Abbott. 2002. "Application of Hawaiian traditions to community-based fishery management." Proceedings of the Ninth International Coral Reef Symposium, Vol. 2, Jakarta, Ministry of Environment, pp. 813-18.
- <sup>137</sup> Friedlander, A., K. Poepoe, K. Poepoe, K. Helm, P. Bartram, J. Maragos, and I. Abbott. 2002. "Application of Hawaiian traditions to community-based fishery management." Proceedings of the Ninth International Coral Reef Symposium, Vol. 2, Jakarta, Ministry of Environment, pp. 813-18.
- <sup>138</sup> Friedlander, A., K. Poepoe, K. Poepoe, K. Helm, P. Bartram, J. Maragos, and I. Abbott. 2002. "Application of Hawaiian traditions to community-based fishery management." Proceedings of the Ninth International Coral Reef Symposium, Vol. 2, Jakarta, Ministry of Environment, pp. 813-18.
- <sup>139</sup> McClenachan, Loren, Benjamin P. Neal, Dalal Al-Abdulrazzak, Taylor Witkin, Kara Fisher, and John N. Kittinger. 2014. "Do community supported fisheries (CSFs) improve sustainability?" *Fisheries Research* 157:62-69. doi: 10.1016/j.fishres.2014.03.016.
- <sup>140</sup> NCSPC. 2012. Starting and maintaining Community Supported Fishery (CSF) Programs: a resource guide for fishermen and fishing communities. In *NSGLC-12-04-03*.
- <sup>141</sup> Greenaway, T. 2012. "Beyond red lists: The power of community-supported fisheries." Last Modified 2012. <http://grist.org/food/beyond-red-lists-the-power-of-community-supported-fisheries/>.
- <sup>142</sup> Witter, A. 2012. "Local Seafood Movements and Seafood Sustainability in North America: A case study on a community supported fishery in Monterey, California." Environmental Sciences, Policy & Management, Lund University.
- <sup>143</sup> Greenaway, T. 2012. "Beyond red lists: The power of community-supported fisheries." Last Modified 2012. <http://grist.org/food/beyond-red-lists-the-power-of-community-supported-fisheries/>.
- <sup>144</sup> Vaughan, Mehana Blaich, and Peter M. Vitousek. 2013. "Mahele: Sustaining Communities through Small-Scale Inshore Fishery Catch and Sharing Networks." *Pacific Science* 67:329-344. doi: 10.2984/67.3.3.
- <sup>145</sup> Matsuoka, J, D McGregor, L Minerbi, and M Akutagawa. 1994. Governor's Moloka'i Subsistence Task Force final report. Honolulu: [The Task Force].
- <sup>146</sup> Matsuoka, J, D McGregor, L Minerbi, and M Akutagawa. 1994. Governor's Moloka'i Subsistence Task Force final report. Honolulu: [The Task Force].
- <sup>147</sup> Matsuoka, J, D McGregor, L Minerbi, and M Akutagawa. 1994. Governor's Moloka'i Subsistence Task Force final report. Honolulu: [The Task Force].
- <sup>148</sup> Hui Mālama O Mo'omomi. 1995. Proposal to Designate Mo'omomi Community-based Subsistence Fishing Area.

- 
- <sup>149</sup> Han, L, E Noordhoek, H Williams, and M Akutagawa. 2012. Agricultural Needs Assessment. In *Sust'ainable Moloka'i*.
- <sup>150</sup> Hawai'i State Department of Health. 2005. Hawai'i Behavioral Risk Factor Surveillance System Results.
- <sup>151</sup> Hawai'i State Department of Health. 2007. Hawai'i Behavioral Risk Factor Surveillance System Results.
- <sup>152</sup> (CDC), Centers for Disease Control and Prevention. 2012. Hawai'i State Nutrition, Physical Activity, and Obesity Profile. National Center for Chronic Disease Prevention and Health Promotion.
- <sup>153</sup> Aluli, N. E. 1991. "Prevalence of obesity in a Native Hawaiian population." *The American Journal of Clinical Nutrition* 53:1556S-1560S.
- <sup>154</sup> Aluli, N. E. 1991. "Prevalence of obesity in a Native Hawaiian population." *The American Journal of Clinical Nutrition* 53:1556S-1560S.
- <sup>155</sup> Fujita, Ruth, Kathryn L. Braun, and Claire K. Hughes. 2004. "The traditional Hawaiian diet: a review of the literature." *Pacific health dialog* 11:250-9.
- <sup>156</sup> True, K. 1994. "Reclaiming Tradition: Native Hawaiian health systems emphasize healing ties to the land." *Good Medicine* IC#39:54.
- <sup>157</sup> Hawai'i State Department of Health. 2007. Hawai'i Behavioral Risk Factor Surveillance System Results.
- <sup>158</sup> Jokiel, P. L., K. S. Rodgers, W. J. Walsh, D. A. Polhemus, and T. A. Wilhelm. 2011. "Marine Resource Management in the Hawaiian Archipelago: The Traditional Hawaiian System in Relation to the Western Approach." *Journal of Marine Biology* 2011:1-16. doi: 10.1155/2011/151682.
- <sup>159</sup> Friedlander, A. M., and E. E. DeMartini. 2002. "Contrasts in density, size, and biomass of reef fishes between the northwestern and the main Hawaiian Islands: the effects of fishing down apex predators." *Marine Ecology-progress Series* 230:253-264. doi: 10.3354/meps230253.
- <sup>160</sup> Jokiel, P. L., K. S. Rodgers, W. J. Walsh, D. A. Polhemus, and T. A. Wilhelm. 2011. "Marine Resource Management in the Hawaiian Archipelago: The Traditional Hawaiian System in Relation to the Western Approach." *Journal of Marine Biology* 2011:1-16. doi: 10.1155/2011/151682.
- <sup>161</sup> (HIPA), Hawai'i Institute for Public Affairs. 2009. Hawai'i Fisheries Initiative: A Comprehensive Review of Hawai'i's Fisheries Industry. In *Final Report to the Economic Development Administration U.S. Department of Commerce*.
- <sup>162</sup> (HIPA), Hawai'i Institute for Public Affairs. 2009. Hawai'i Fisheries Initiative: A Comprehensive Review of Hawai'i's Fisheries Industry. In *Final Report to the Economic Development Administration U.S. Department of Commerce*.
- <sup>163</sup> (HIPA), Hawai'i Institute for Public Affairs. 2009. Hawai'i Fisheries Initiative: A Comprehensive Review of Hawai'i's Fisheries Industry. In *Final Report to the Economic Development Administration U.S. Department of Commerce*.

- 
- <sup>164</sup> (HIPA), Hawai'i Institute for Public Affairs. 2009. Hawai'i Fisheries Initiative: A Comprehensive Review of Hawai'i's Fisheries Industry. In *Final Report to the Economic Development Administration U.S. Department of Commerce*.
- <sup>165</sup> (HIPA), Hawai'i Institute for Public Affairs. 2009. Hawai'i Fisheries Initiative: A Comprehensive Review of Hawai'i's Fisheries Industry. In *Final Report to the Economic Development Administration U.S. Department of Commerce*.
- <sup>166</sup> McCoy, Kaylyn. Estimating nearshore fisheries catch for the main Hawaiian Islands. Unpublished master's thesis. University of Hawai'i at Mānoa. Honolulu, Hawai'i.
- <sup>167</sup> Friedlander, A. M. 2004. "Status of Hawai'i's coastal fisheries in the new millennium." 2004.
- <sup>168</sup> Pooley, S.G. 1993. Hawaii's Marine Fisheries: Some History, Long-term trends, and Recent Developments. *Marine Fisheries Review* 55(2) p. 7-19. Online: [http://www.nmfs.noaa.gov/pr/interactions/fkwtrt/meeting1/longline\\_fishery/hi\\_fisheries.pdf](http://www.nmfs.noaa.gov/pr/interactions/fkwtrt/meeting1/longline_fishery/hi_fisheries.pdf)
- <sup>169</sup> Western Pacific Regional Fishery Management Council. 2006. Information and Management Alternatives Regarding Overfishing in the Hawaii Bottomfish Fishery. p. 25. Report materials prepared for Public Meeting. Online: <http://www.wpcouncil.org/bottomfish/Documents/MaterialforPubliMeetings-2006-Jan4FinalDraft.pdf>
- <sup>170</sup> Hawaii Department of Land and Natural Resources. 2015. Report on the Findings and Recommendations of Effectiveness of the West Hawai'i Regional Fishery Management Area. Report to the Thirtieth Legislature 2015 Regular Session. p. 51 Online: [http://dlnr.hawaii.gov/dar/files/2015/01/ar\\_hrs188\\_2015.pdf](http://dlnr.hawaii.gov/dar/files/2015/01/ar_hrs188_2015.pdf)
- <sup>171</sup> Duerr, Bob. 2014. (Exact publication date unknown.) "No Fishing with No Science." *Hawai'i Fishing News*, 18. (Quote used with the permission of the speaker.)
- <sup>172</sup> (DAR), Division of Aquatic Resources. 2015. Commercial marine landings 2010-2014. Department of Land and Natural Resources, State of Hawai'i.
- <sup>173</sup> (DAR), Division of Aquatic Resources. 2015. Commercial marine landings 2010-2014. Department of Land and Natural Resources, State of Hawai'i.
- <sup>174</sup> Stamoulis, K. A, and A. M Friedlander. 2013. "A seascape approach to investigating fish spillover across a marine protected area boundary in Hawai'i." *Fisheries Research* 144:2-14. doi: 10.1016/j.fishres.2012.09.016.
- <sup>175</sup> Gove, J. M, M. A McManus, A. B Neuheimer, J. J Polovina, J. C Drazen, C. R Smith, M. A Merrifield, A. M Friedlander, J. S Ehse, C. W Young, A. K Dillon, and G. J Williams. 2016. "Near-island biological hotspots in barren ocean basins." *Nature Communications* 7. doi: 10.1038/ncomms10581.
- <sup>176</sup> Roberts, C. M, J. A Bohnsack, F Gell, J. P Hawkins, and R Goodridge. 2001. "Effects of Marine Reserves on Adjacent Fisheries." *Science* 294 (5548):1920-1923. doi: 10.1126/science.294.5548.1920.



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<sup>177</sup> Johnson, J. T, R Howitt, G Cajete, F Berkes, R. P Louis, and A Kliskey. 2016. “Weaving Indigenous and sustainability sciences to diversify our methods.” *Sustainability Science* 11 (1):1-11.

<sup>178</sup> Turner, N. J, and K. L Turner. 2008. ““Where our women used to get the food”: cumulative effects and loss of ethnobotanical knowledge and practice; case study from coastal British Columbia.” *Botany* 86 (2):103-115. doi: 10.1139/B07-020.

## GLOSSARY OF HAWAIIAN WORDS

‘Aha Kiole	traditional Hawaiian system of natural resource management
ahupua‘a	land division usually extending from the uplands to the sea, often managed by a konohiki. This Health Impact Assessment uses a published definition from Dr. Kamanamaikalani Beamer: an ahupua‘a is a “culturally appropriate, ecologically aligned, and place-specific unit(s) [of land] with access to diverse resources.”
‘ai ‘ono	eat what you crave
‘ai pono	eat healthy; traditional Hawaiian staple foods
‘āina	<i>lit.</i> that which feeds; often used to refer to land or earth
‘āina momona	Abundance of resources
ali‘i	chief(s)
aloha ‘āina	love of the land
‘eleu	quick, energetic, active
ha‘aha‘a	humble
he‘e	octopus
holoholo	To go fishing; go for a walk, ride, or sail; go out for pleasure
i‘a	fish
‘ike	knowledge, awareness, understanding
‘imi ‘ike	to seek knowledge, a seeker of knowledge
kalo	taro
kama‘āina	native-born
kanaka ( <i>p/l.</i> kānaka)	human being, person
kānāwai	law, code, rule
kapu	forbidden, prohibited
kapu system	traditional Hawaiian laws
keiki	child, children
kīpuka	safe place; preserve; refuge; a place where native species thrive and replenish
kōkua	help, assist(ance)

<b>konohiki</b>	resource manager of an ahupua‘a under the chief; land or fishing rights under control of the konohiki
<b>kuleana</b>	responsibility, privilege, concern
<b>kumu</b>	white saddle goatfish ( <i>Parupeneus porphyreus</i> )
<b>kupuna</b> ( <i>pl.</i> kūpuna)	respected elder; grandparent; ancestor
<b>laulima</b>	cooperation, working together
<b>lawai‘a pono</b>	responsible fishers
<b>lōkahi</b>	harmony, unity, agreement
<b>loko i‘a</b>	fish pond, aquaculture
<b>mahele</b>	sharing; portion, division
<b>makai</b>	in the direction of the sea, oceanside
<b>mākua</b>	parental generation
<b>mālama</b>	take care of, care for, tend, preserve, protect
<b>mālama ‘āina</b>	care for the land
<b>mauka</b>	in the direction of the mountains or uplands, mountainside
<b>‘ohana</b>	(extended) family
<b>‘ono</b>	crave, relish, hungry for; delicious
<b>‘opihi</b>	limpet
<b>‘opio</b>	youth
<b>pa‘akai</b>	salt
<b>pono</b>	balance, proper, righteous, right relationship
<b>pu‘uhonua</b>	place of refuge, sanctuary
<b>ula</b>	spiny lobster ( <i>Panulirus marginatus</i> )
<b>‘ulu</b>	breadfruit ( <i>Artocarpus altilis</i> )
<b>‘uala</b>	sweet potato ( <i>Ipomoea batatas</i> )

# APPENDIX A: QUALITATIVE INTERVIEW GUIDE AND SURVEY

## Four Main Areas:

- Fish/marine resource consumption
- Ability to practice traditional marine activities and transmit traditional practices to subsequent generations
- Self-determination/sovereignty over resources
- Fish/marine resource sales (Livelihood–subsistence vs. artisanal)

## Introduction/Background

1. Can you tell me a little about your family background? Where you and your family are from?
2. Can you describe your personal association with the Mo‘omomi CBSFA and how that place affects your life (directly or indirectly)?
3. What value does the Mo‘omomi CBSFA have for you/for Molokai? Does this area have a boundary and what is that to you?

## Ability to Practice Traditional Marine Activities

1. Can you describe cultural/traditional practices that are associated with the Mo‘omomi CBSFA? (Specifically to participant and then more generally) Who accesses the Mo‘omomi CBSFA and for what reasons? [a-e to be asked as triggers]
  - a. **Fishing:** (What type of fishing method? What fish? Where are they found? Frequency of fishing and who do you do this activity with? Purpose of fishing? What time of year? Why at Mo‘omomi?)
  - b. **Limu gathering:** (What type of fishing method? What limu? Where are they found? Frequency of practice and who do you do this activity with? Purpose of fishing? What time of year? Why at Mo‘omomi?)
  - c. **Lā ‘au lapa‘au:** (What type of lapa‘au practice? Where are resources found? Frequency of practice and who do you do this activity with? Why at Mo‘omomi?)
  - d. **Religious/spiritual/huaka‘i:** (Describe religious practice? Where practiced? Frequency of practice and who do you do this activity with? Why at Mo‘omomi?)
  - e. **Paddling/Sailing/Swimming/Diving/Recreation:** (Describe practice? Where practiced? Frequency of practice and who do you do this activity with? Purpose of practice? Why at Mo‘omomi?)
  - f. **Mo‘olelo:** (What mo‘olelo are associated with the Mo‘omomi CBSFA? What significance do these stories carry for you and who do you share them with?)
  - g. **Others? Opihi/lobster/ahi/octopus**

2. Are there cultural protocol for accessing the CBSFA that you know of? What are these protocol?
3. What is the significance of these **cultural practices** to your life?
4. Do these practices affect your health and in what ways do they affect your health?
5. Do you or your family depend on the resources of the Mo‘omomi CBSFA? How are you dependent on these resources? In what ways do other people in your community depend on these resources?

### **Transmitting Cultural Knowledge/Education**

Can we talk more about the perpetuation of the cultural knowledge, practices, and resources that you described...

1. Is the transmission of traditional knowledge and practices to younger generations important to you? Please explain?
2. Can you explain how the transmission of traditional fishing practices is currently happening today in Molokai and how this knowledge is passed on and kept alive?
3. What role does the Mo‘omomi CBSFA play in this process?
4. Do you have a sense for how the younger generation feels about the Mo‘omomi CBSFA rule-making process and their role in this process? Please explain.
5. How would the approval of the CBSFA community-based rules affect this intergenerational sharing of knowledge?

### **Self-Determination/Sovereignty over Resources**

1. What does self-sufficiency mean to you?  
Can we talk about subsistence? Moloka‘i is known in Hawai‘i to have a higher level of subsistence than any other community...
2. What is the value of subsistence (how important) for families in Molokai? Can you describe the subsistence lifestyle? [Follow-up question..what other reasons other than to feed your family, are products from the CBSFA used for?]
3. How does subsistence affect your health and well-being? Of the people of Moloka‘i?

4. Can you tell me about the CBSFA project and what value does it have to Molokai as a community? As an island? To the state of Hawai'i? To Hawaiian people? [Follow-up Question] Are there other reasons beyond protecting the marine resources and traditional fishing practices that the CBSFA may hold for Molokai as a community?

### **Rules**

1. How involved have you been in the CBSFA initiative and what has been your role in that process?
2. Who are the main actors in this CBSFA process?
3. Can you explain how the rules were formed and to what degree did the Molokai community participate in that process? Please explain.
4. Do you have a sense of the general sentiments that people of Molokai have about the CBSFA being managed by the community? How has it affected community relationships? Between people of Molokai and those not from the island? Between the State of Hawai'i (DLNR) and the people of Moloka'i? Does the CBSFA unite or divide the Molokai community?
5. To your knowledge, does Molokai have an existing community-based structure in place to manage rules of access and use at Mo'omomi? Does Moloka'i have the capacity to self-govern and enforce these rules?

### **Potential Impacts of Community-Based Rules**

If rules to manage access and use of the CBSFA are established and enforced by the community legally [as opposed to existing state management of the ocean in Hawai'i]:

1. How will this affect your health and well-being? (& Moloka'i people)? Your level of physical activity? Frequency/nature of at-risk behavior (eg., smoking/drug/alcohol) of Molokai residents?
2. How will this affect food security on Molokai? The ability of people to be self-sufficient?
3. How will this affect your fish consumption? (& Moloka'i people)?
4. How will this affect your ability to carry out your traditional practices? (& Moloka'i people)? Intergenerational transmission of this knowledge?

5. How will this affect your sense of connection to place? Your relationship to the ocean (& Molokai people)? Your identity?

### **Recommendations**

1. Do you have any recommendations for how administrative rules for managing the CBSFA could be improved to better protect the resources of the Mo'omomi CBSFA?
2. Do you have any recommendations regarding issues of access? Please explain.
3. Do you have any other mana'o or recommendations that you feel strongly about that you would like to share concerning the CBSFA?

Aloha! Please fill out this short survey to help us understand where people are getting their food from on Moloka'i. Mahalo nui loa for your kōkua.

Date of Birth: _____	Are you Hawaiian? Yes No
Area in Moloka'i you identify with: _____	Gender: M F
Number of people in your household: _____	

1. Approximately how many meals does your household usually eat per week that contain items (frozen or fresh) caught or grown locally in Moloka'i by you, a member of your 'ohana, or close friend? (e.g., fish, 'opihi, deer, pig, kalo, 'uala, poi, etc.)
2. Approximately how many meals does your household usually eat per week that contain marine products (frozen or fresh) caught locally in Moloka'i by you, a member of your 'ohana, or close friend? (fish dependence)
3. How many of those meals in Question #2 come from marine products caught by someone outside of your household that was given to you through aloha/barter/gift exchange? (traditional exchange)
4. How many of those meals in Question #2 come from marine products that you buy from a local fisherman/market? (sale)
5. In the last month, approximately what percentage of your household income came from the sale of marine products caught at the Mo'omomi Community-Based Subsistence Fishing Area? (income)  
\_\_\_\_\_ %
6. If you fish, gather limu, pick 'opihi, or collect lobster/crab and invertebrates at the Mo'omomi CBSFA, what are they used for? Circle all that apply. (Use/consumption)
  - a. Feed my family
  - b. Family/community events eg., birthday lū'au, funeral, wedding etc
  - c. Sell for cash
  - d. Exchange for other resources with family & friends
  - e. Other \_\_\_\_\_



7. Do you eat less fish caught in Moloka'i now compared to 10 years ago? (Change)
  - a. Yes
  - b. No
  - c. No change
  
8. How would you rate your health? (Health perception)
  - a. Excellent
  - b. Very good
  - c. Good
  - d. Fair
  - e. Poor
  
9. Please indicate how this statement best applies to you:  
"The ability to provide food for my family from the land (eg., through hunting, fishing, farming), is important to me." (Identity/Values)
  - a. Strongly Agree
  - b. Agree
  - c. Neutral
  - d. Disagree
  - e. Strongly Disagree